

Operational Manual



Ht810

datalogger

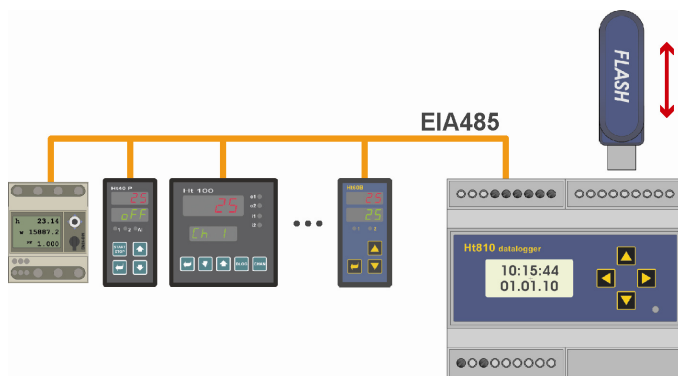
in use as convertor RS232 / EIA485 (protocol MODBUS RTU)

1 Usage of device

Ht810 is intended to be mounted on DIN rail. The main scope is to record the measured values from the devices connected to it or to the external FLASH. This device can be used also as convertor RS232/EIA485 for the dedicated devices, showing data in figure format or in the graph,...

The following chapter will describe this usage.

1.1 Transferring/copying data to external Flash



- Devices under monitoring are linked through the line EIA485 with datalogger Ht810.
- Ht810 monitors the status of the connected devices and stores the data into internal memory (in a whole it is possible to write into the memory at minimum 73620 logs – acc. to number of monitored devices).
- Data can be anytime transferred to external Flash memory. Data are stored in the format „*.csv“ and it is possible to edit the data with help of program MS Excel or any other process calculators.

For using this datalogger in this mode you should know:

- Setting of datalogger,
- Setting of the period for archiving,
- Starting and ending up the logging,
- Copying data to external Flash,
- It makes deleting of datalogger.

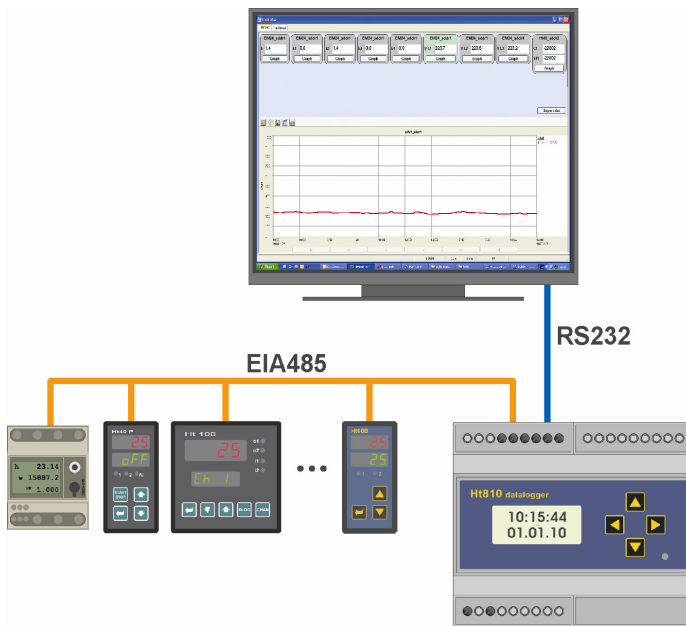
More information can be found in the chapter *How to use* datalogger, which begins on page 10.

1.2 Permanent data-storing to external Flash



- Ht810 enables to store data directly to external Flash memory (simultaneously with storing to internal memory).
- Setting remains the same as in the previous case.
- Description of starting/ending of data storage to external memory, the format of the stored values, ..., you will find in the chapter *Recording to external Flash*, which begins on the page 13.

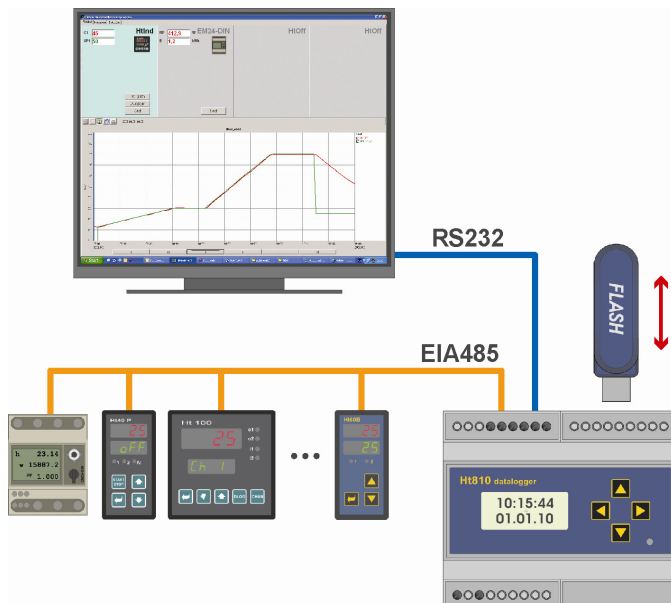
1.3 Monitoring of devices through software Ht810Sw



For datalogger Ht810 is software provided:

- Ht810Sw-light ... free version of the software which monitors data of all the devices and makes possible datatransfer into PC. Data are stored in the format „*.csv“.
- Ht810Sw ... full paid version of software. Software stores data into database, views data (temperature) in graph, ...

1.4 Convertor RS232 / EIA485

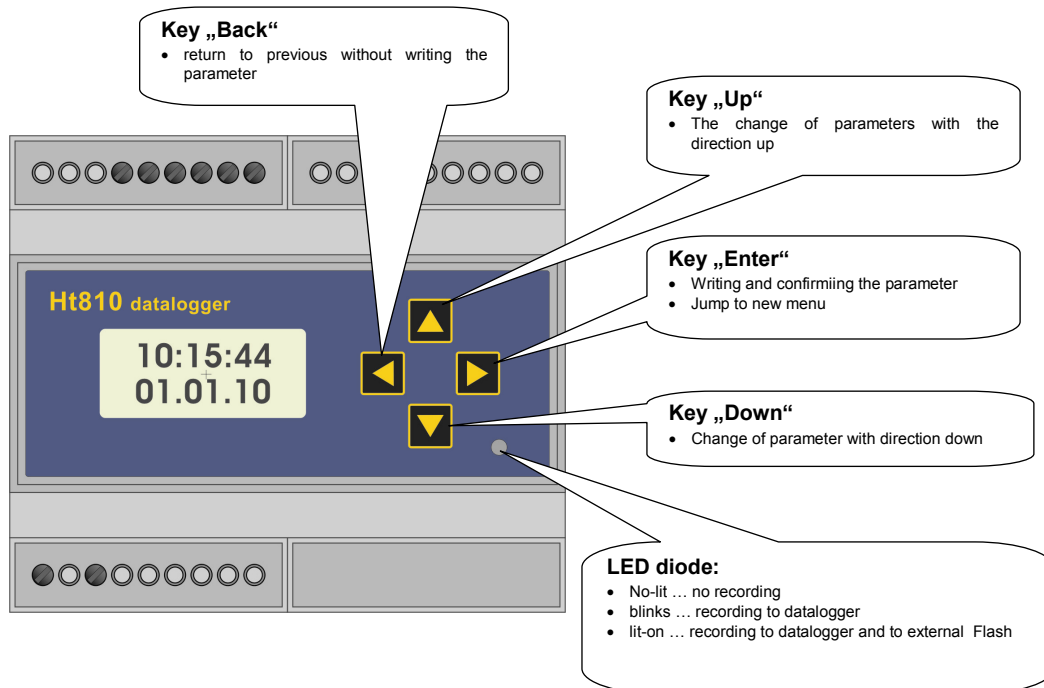


Ht810 can be used as galvanically insulated convertor RS232 / EIA485.

- To the line RS232 is connected PC, devices under monitoring are connected to the line EIA485.
- On each device you are advised to set the address in the range from 1 to 250.
- Through the line **com2** (RS232) Ht810 linked with PC. On device Ht810 it can be chosen the address from 251 to 255.
- If any of the devices linked to line com1 is addressed with PC, Ht810 hands over the demand and returns the data sent by the device.
- If Ht810 is addressed with PC (address 251 to 255), data from Ht810 are returned.
- Datatransfer between PC and devices on the line EIA485 is slower with regard to standard convertor.

2 Short description of device

Device Ht810 is controlled through 4 key-buttons in menus. All indicators are shown on 2-line display and 1 LED diode. The meaning of keys is described below:



2.1 Basic mode of device

In basic mode Ht810 is after turning ON.

On upper display the actual time is displayed, on lower display there is an actual date. Error and information messages are indicated in basic mode instead of time and date.

2.2 How to lock the device

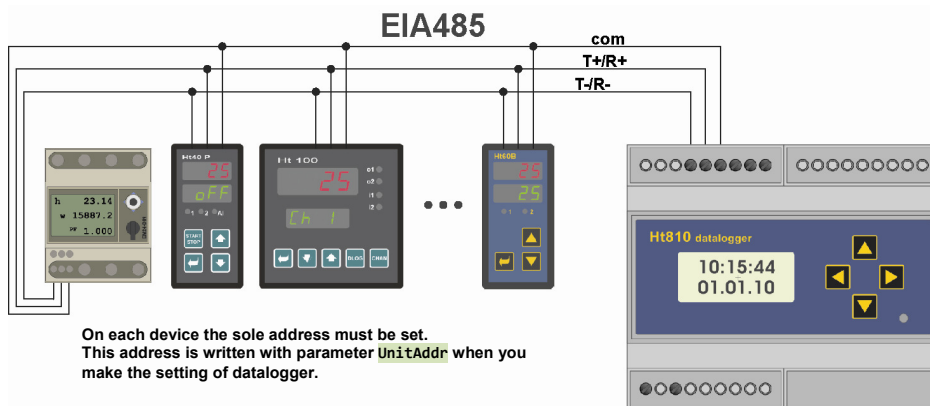
In Ht810 you can secure the entering to the chosen menus *in user level* (**ExtFlash**, **DatLogg**, **Memory**) and to levels (**Oper**, **Conf**, **Serv**) with PASSWORD.

You can set the particular passwords in *configuration level*, menu **Password**:

- **PasFlash** ... enter password for menu copy / record to external Flash (**ExtFlash**, only in user level).
- **PassDlog** ... enter password for menu starting / stopping datalogger (**DataLogg**, only in user level).
- **PassMem** ... enter password for menu to delete the memory of datalogger (**Memory**, only in user level).
- **PassOper** ... enter password for operational level.
- **PassConf** ... enter password for configuration level.
- **PassServ** ... enter password for service level.

3 Wiring of devices to Ht810

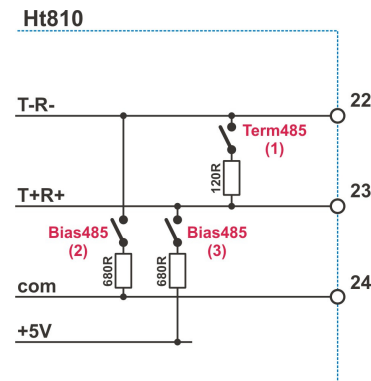
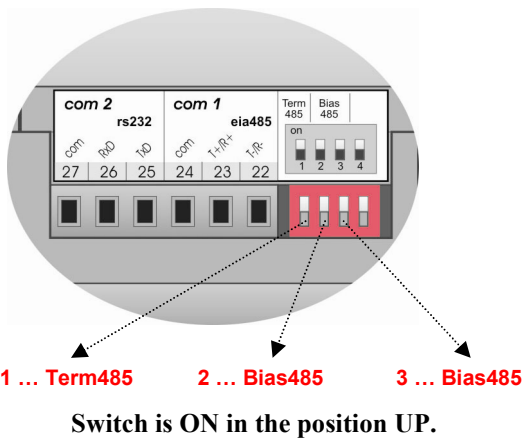
Devices are wired to the communication line EIA485 in the way below.



End-wiring and stand-by mode of communication line

In the datatransferring through the line EIA485 sometimes it can happen, that all the devices on the line are in the status of receiving. In this moment the state of the line is not clearly defined. For that reason it is necessary to define it, for example with help of resistors in the device Ht810:

- **Term485** ... it terminates the impedance to the line EIA485 and thus avoids the reflection of the signal. These resistors should be connected on both ends of the cable.
- **Bias485** ... resistors define the stand-by status of the line EIA485 and thus help to reduce the interference of the line in the time, when all the devices are in the state of receiving.










List of devices that can be linked to Ht810

- **HtIndustry** ... programmable controller.
- **HtCeramic** ... programmable controller.
- **Ht40A, Ht40B, Ht40P, Ht40T** ... controllers.
- **Ht60B, Ht60M** ... controllers, meters.
- **Ht700** ... limiter on DIN rail.
- **EM24** ... energy meter.

Viewing of recorded data in menu Ht810

Actual recorded data you can view in menu **Show485**. This menu can be found in *operational level* and can be made accessible in *user level*.








<p>yes Show485</p>	<p>Go to menu Show485 and set yes. Confirm with the arrow .</p>
<p>522 Data 1</p>	<p>On the first position is shown the measured value Data 1 (first measured value according to the setting of datalogger – corresponds 1. column in the table). Between data you browse with the keys  and .</p> <p>You will return with pushing the key .</p>
<p>519 Data 2</p>	<p>On the second position is shown the measured value Data 2 (second measured value according to the setting of datalogger – corresponds to 2.column in the table). Between data you browse with the keys  and .</p> <p>You will leave the menu with the arrow-key .</p>
<p>...</p>	

Diagnostics of communication line

On the line EIA485 it is possible to diagnose:

- **UErr x** ... number of the fault communications with the unit „x“ since the switching ON of datalogger Ht810.
- **UTime x** ... time in hundredth of second necessary for the communication with the unit „x“.

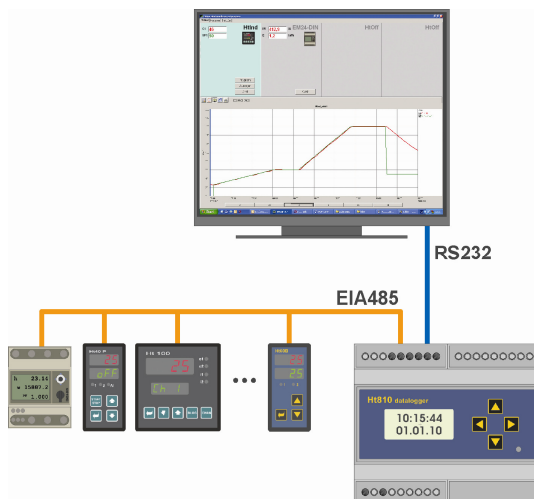
Diagnostics of communication line EIA485 finds oneself in menu **Diag485**. This menu appears in *operational level* and it can be accessible in *user level*.

<p>yes Diag485</p>	<p>Go to menu Diag485 and set yes. Confirm with the arrow key .</p>
<p>0 UErr 1</p>	<p>First parameter is UErr 1 – number of errors within the communication with the unit no. 1. Between the items you browse with the arrow keys  and .</p> <p>You will leave the menu with the arrow key .</p>
<p>12 UTime 1</p>	<p>Second parameter is Time 1 – time in hundredth of second necessary for the communication with the unit 1. Between the items you browse with the arrow keys  and .</p> <p>You will leave the menu with the arrow key .</p>
<p>0 UErr 2</p>	<p>Another parameter is UErr 2 – number of errors within the communication with the unit no. 2.</p>
<p>...</p>	

4 Links of PC to datalogger Ht810

Personal computer (PC) is linked to the line RS232. The connection can be:

- Direct ... if the PC is equipped with the line RS232 (mainly with the desk-top computer).
- Through convertor USB / RS232 ... mainly for notebook. The convertor creates the port RS232 from the port USB.



Possibilities of communications between Ht810 and PC are described in the following chapters.

Ht810Sw – light ... monitoring of devices, data transfer from datalogger to PC

Ht810Sw-light is a free version of software intended for monitoring of the devices linked to the unit Ht810 and for datatransferring from datalogger Ht810 to PC.

It shows the state of all devices

- List of linked devices is read out automatically.
- Measured values are shown on displays.

Data transfer from datalogger

- Data are transferred via the com. line.
- Data are stored in the format *.csv

The screenshot shows the Ht810Sw software interface. At the top, there is a list of devices with their measured values and a 'Graph' button for each. The devices and their values are:

Device	Value
EM24_addr1	E 1,4
EM24_addr1	E1 0,0
EM24_addr1	E2 1,4
EM24_addr1	E3 0,0
EM24_addr1	E4 0,0
EM24_addr1	V.L1 223,7
EM24_addr1	V.L2 223,5
EM24_addr1	V.L3 223,2
Ht80_addr2	C1 -22002
Ht80_addr2	SP1 -22002

At the bottom right, there is an 'Export dat' button.

Ht810Sw ... monitoring and recording of devices, transfer of data from datalogger to PC

Ht810Sw ... full version of program. Unlike to the light version it stores data into database and displays the data in the graph. Software has the component for working with database – database manager.

Shows the status of all devices

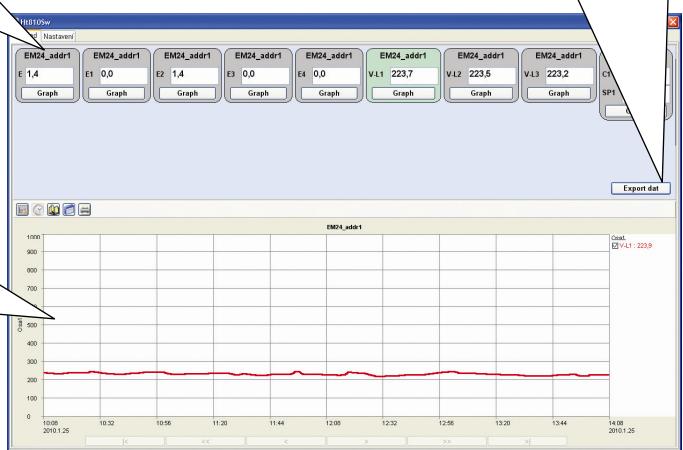
- List of connected devices is read automatically.
- Measured values are shown on displays for each device.

Transfer of data from datalogger

- Data are transferred through the line.
- Data are stored in the format „*.csv“

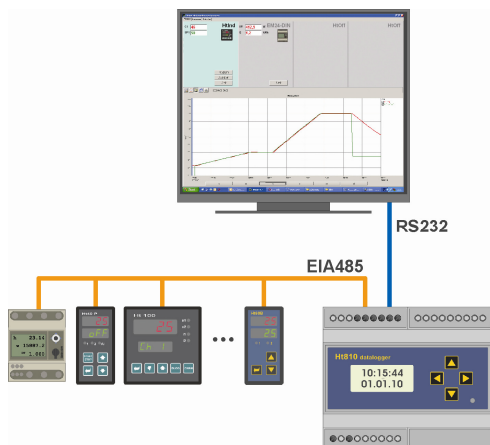
Showing in graph

- All measured data are recorded into database and shown in graph.
- In graph you can set scale of measured values, time line, ...
- In graph you can go through the history.



Convertor RS232 / EIA485

Datalogger Ht810 can be used as convertor between PC and the devices connected to the line EIA485. But this convertor is capable to process the data only from the devices listed in chapter Wiring of devices to Ht810.



Unlike to the standard convertor the Ht810 is slower. Principle of convertor is as follows:

- Receiving the request from PC, decoding the request.
- If the request is directed to the line EIA485, then it sends the request via the line EIA485.
- Receiving the answer from device and putting this answer on the line RS232.
- Sending answer via the line RS232.

Configuration, reading of the state, ..., of the device Ht810

For the device Ht810 it is possible to set the address in the range from 251 to 255. On this address it is possible to communicate with Ht810:

- To set and read the parameters,
- To read the settings of the connected devices,
- To read the measured values of the connected devices,
- To read the data from the datalogger.

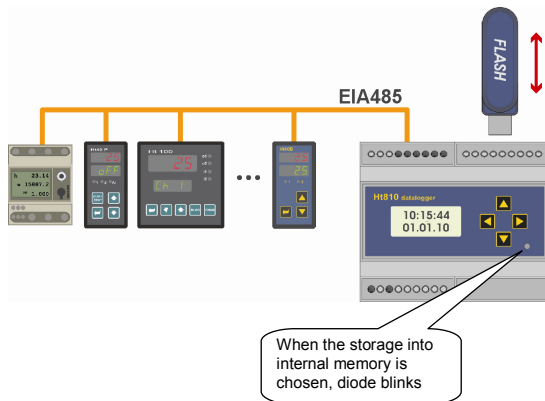
The description of the communication line is in another manual.

5 How to use datalogger

Device Ht810 is equipped with the memory intended for the data storage from the connected devices. Data are stored into:

- Internal memory of datalogger. These data can be loaded to external Flash.
- External Flash. The number of the recorded logs depends on the capacity of Flash.

5.1 Recording to internal memory of datalogger



Data are read from the devices that are linked to the line EIA485 and data are stored in the internal memory of datalogger.

Recorded data are possible:

- To copy to external Flash,
- To transfer to PC through communication line RS232.

Setting of datalogger

The devices are linked to the line EIA485. It can be linked maximum 16 devices.

Make the configuration of datalogger (setting of devices and values to be stored into database), see page [15](#).

Set the period for archiving with the parameter **PerArch**, parameter is in *operational level* or it can be made accessible in *user level*.

Set the period for reading data from the devices with the parameter **PerRead**, parameter is found in *operational level* or it can be made accessible in *user level*.

Starting / ending of data storage

Starting of the datalogger is performed with setting the command **DataLogg = Run**.

Ending the recording to datalogger is carried out with the command **DataLogg = Stop**.

Command **DataLogg** is found in *operational level* or in *user level*. In *user level* it is possible to secure the access with password.

Procedure of copying of data to external Flash

Number of records, copying to external Flash or through the communication line to PC, it can be limited with the parameter **CopyRec** to the following numbers:

CopyRec =	1000	... copying limited to the last 1000 records,
CopyRec =	2000	... copying limited to the last 2000 records,
CopyRec =	5000	... copying limited to the last 5000 records,
CopyRec =	10000	... copying limited to the last 10000 records,
CopyRec =	20000	... copying limited to the last 20000 records,
CopyRec =	50000	... copying limited to the last 50000 records,
CopyRec =	Full	... all stored data are transferred.

Number of records have the influence on:

- **Time for transfer** ... full memory of datalogger (it makes for example 302660 records for the monitoring of 5 controllers Ht40) is transferred about 4 hours. The less data, the less time for transferring.
- **Option for showing data on PC** ... data are stored into files „*.csv“. These files can be opened in programs such as MS Excel, Open Office, The size of files, which can be loaded and opened in these programs, is limited (for example old version of MS Excel allows to open the file with max. 65536 rows).

Procedure for copying is in the following table:

	Insert the external Flash into device Ht810.
Copy ExtFlash	Copying starts with the setting of parameter ExtFlash = Copy . Parameter ExtFlash is found in <i>operational level</i> , or in <i>user level</i> .
56% Copy	When copying runs, you can see the volume of copied values in [%].
14:38:20 08:12:09	When the copying is finished, the device returns to basic mode, i.e. on display you can see the actual time and date.

Interruption of copying data

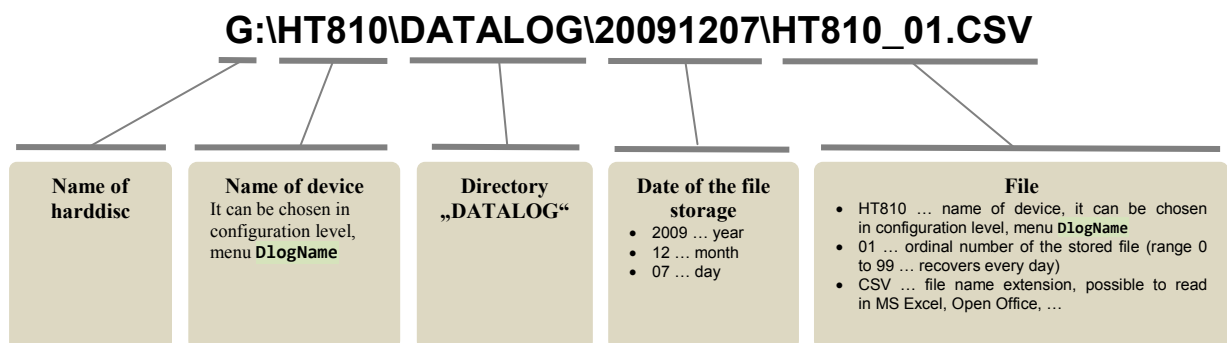
In the course of copying it is not allowed to take out external Flash from Ht810 device, otherwise you can loose data and thus it blocks the unit for the communication with external Flash (in this case it is necessary to switch OFF and ON the device Ht810).

If you want to interrupt the copying, follow the instructions below:

25% Copy	Ht810 indicates the data transfer from the memory of datalogger into external Flash.
Stop ExtFlash	Choose the parameter ExtFlash , set Stop and confirm.
14:38:20 08:12:09	The device returns to basic mode (on display the clock is shown). External Flash can be safely taken out.

Address structure when data copying, command „Copy**“**

All the data from datalogger are transferred into the file:



To the external Flash the data are transferred in the format „*.CSV“.
These files can be opened in the programs such as MS Excel, Open Office, ...

Capacity of datalogger


Internal memory of datalogger has the size 64Mbit. Volume of records indicates the following table:

Monitored devices	Number of registers	Total number of records	Time of recording At period of archiving 1min.
5 x Ht40	10	302660	210 days
10 x EM24, energy meters	20	179960	124 days
3 x 10-channel Ht100	30	122700	85 days
10 x EM24, energy meters + 2 x 10-channel Ht100	40	98160	68 days
5 x 10-channel Ht100 (maximum number of registers in Ht810)	50	73620	51 days

When the memory is full, the oldest data are rewritten with the newer ones.

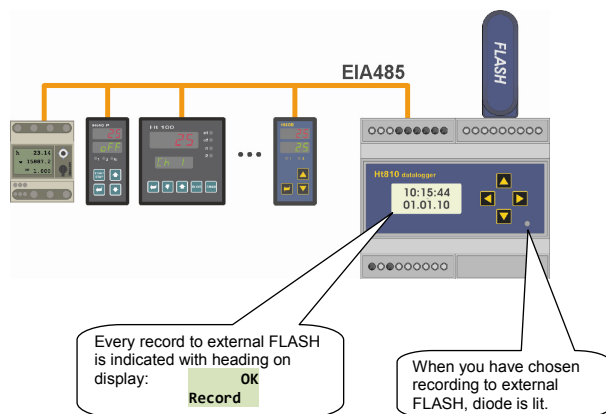
To delete of memory of datalogger

Memory of datalogger is always deleted when you perform new setting of datalogger.

Memory of datalogger can be deleted with the setting parameter **Memory** = **Delete** and confirming with the key . Parameter **Memory** is found in *operational level* or it can be placed in *user level*.

In *user level* the deleting memory can be secured with password. Password can be chosen in *configuration level*, menu **Password**, parameter **PassMem**, see page 28.

5.2 Recording to external Flash



Data are read from the devices connected to line EIA485 and written into internal memory of datalogger and external Flash memory.

For storing/writing data to internal memory it's all that was described above.

Data in external memory are written in 2 same files for the reason, that when somebody takes FLASH out when in writing mode, some data can get lost.

- For permanent recording to external Flash the datalogger must be run (**DataLogg** = **run**).
- At the same time the storing into the internal memory of datalogger runs.
- Permanent recording to external FLASH is set with the parameter **ExtFlash** = **Record**.
- Recording is performed at the same time period as the recording into memory of datalogger (parameter **PerArch**).

Procedure for turning ON the permanent recording to external Flash

	Insert external Flash to device Ht810.
Record ExtFlash	Permanent recording is chosen with the parameter ExtFlash = Record . Parameter ExtFlash is found in <i>operational level</i> , or <i>user level</i> . Recording to external Flash runs only when the datalogger runs (DataLogg = run)
OK Record	Every record to external Flash is indicated with the heading on display „Record OK“

Ending of permanent recording

Before you take out external Flash, you should end the permanent recording in menu of device. If you omit it, the data can get lost or it can come to blocking of the unit for the communication with external FLASH (in this case it is necessary to switch OFF and ON the device Ht810).

Procedure is:

Stop ExtFlash	Find the parameter ExtFlash , set Stop and confirm.
14:38:20 08:12:09	Device returns to basic mode (on display there is the clock shown). External Flash can be safely taken out.

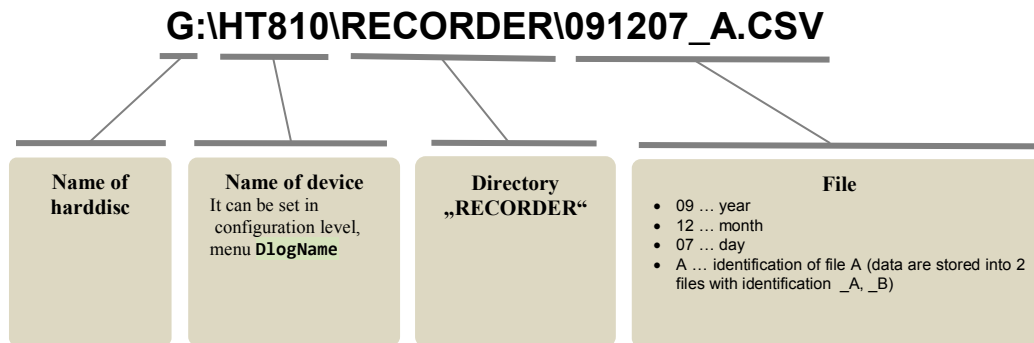
Address structure at the permanent data recording, command „Record“

Data are stored/recorded into 2 files:

- xxxxxx_A.CSV
- xxxxxx_B.CSV

Recording into 2 files is performed due to the possible loss of data in case, when FLASH is taken out without ending recording and the device currently makes recording into some file.

Every day the new couple of files is created.



5.3 Setting of datalogger

List of devices that will be linked to Ht810 and monitored through Ht810, should be chosen in *configuration level*, menu **DlogSet**.

Description of configuration level is found on [25](#) and further.

Enter to menu **DlogSet**

DlogSet = no	No enter to menu DlogSet .
DlogSet = View	You enter to menu DlogSet . In menu you can only view parameters, no deleting data in datalogger can happen.
DlogSet = !!Edit!!	You enter to menu DlogSet . In menu you can view and change the parameters, when you make a change in parameters, memory of datalogger will be deleted.

Setting of parameters of dataloggers

You can set the device or you can view the data from any register. Meaning of parameters is described below:

Unit	Ordinal number of unit. Range 1 to 16.
UnitType	Type of unit: <ul style="list-style-type: none"> off ... No unit. Manual ... Manual setting of the read register, viewed/read is only the register on the address RegAddr. Length of register is 2B, value of register is not modified. Ht100 ... Multichannel meter Ht100, it can be viewed 2, 4, 6, 8 or 10 channels. Values of registers are divided by 10 (showing in °C). HtInd ... Controller HtIndustry, the measured and stp point values are read + max. 10 Slave controllers. Values of registers are divided by 10 (showing in °C). Ht40 ... Controllers Ht40, measured and stp point values are read. Values of registers are divided by 10 (showing in °C). Ht60 ... Controllers Ht60, measured and stp point values are read. Values of registers are divided by 10 (showing in °C). Ht700 ... Devices Ht700, measured and stp point values are read. Values of registers are divided by 10 (showing in °C). Em24 ... Devices EM24 ... energy meters.
UnitAddr	Address of unit. Range: 1 to 250.
RegAddr	Address of the register to be read when in setting UnitType = Manual . Range: 0 to 3000.
Channel	Number of measured channels for meter Ht100 (UnitType = Ht100). Range: 2, 4, 6, 8, 10
Slave	Number of SLAVE controllers connected to MASTER - HtIndustry. Parameter is shown when in setting UnitType = HtInd . Range: 0 to 10
Measure	Data measured by energy meter EM24: <ul style="list-style-type: none"> E ... total consumed electrical energy in[kWh] E1 ... consumed energy in [kWh], tariff 1 E2 ... consumed energy in [kWh], tariff 2 E3 ... consumed energy in [kWh], tariff 3 E4 ... consumed energy in [kWh], tariff 4 IW ... average active power in [W] V-L1 ... voltage in the phase L1 in [V]

- **V-L2** ... voltage in the phase L2 in [V]
- **V-L3** ... voltage in the phase L3 in [V]
- **A-L1** ... current in the phase L1 in [A]
- **A-L2** ... current in the phase L2 in [A]
- **A-L3** ... current in the phase L3 in [A]
- **W-L1** ... active power in phase L1 in [W]
- **W-L2** ... active power in phase L2 in [W]
- **W-L3** ... active power in phaase L3 in [W]
- **PF-L1** ... power factor, phase L1
- **PF-L2** ... power factor, phase L2
- **PF-L3** ... power factor, phase L3

Important:

If you want to read more values from 1 device, it is necessary to use the multiple setting of device with the requested parameter for reading in the menu of the datalogger.

Example: you want to read from the energy meter EM24 (which is on the address 1) total consumed electric energy (**E**), voltage in the phase L1 (**V-L1**), voltage in the phase L2 (**V-L2**) and voltage in the phase L3 (**V-L3**).

Set in the datalogger:

Unit	UnitType	UnitAddr	Measure
1	Em24	1	E
2	Em24	1	V-L1
3	Em24	1	V-L2
4	Em24	1	V-L3

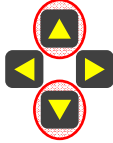
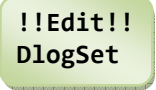



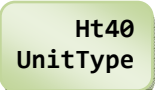

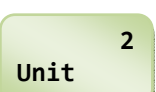
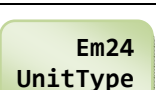
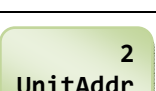

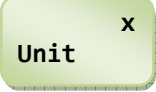
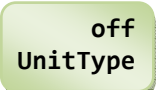
The table looks as follows:

	A	B	C	D	E	F	G	H	I	J
1	Ht810									
2										
3	DATE	TIME	ADR1_E	ADR1_V-L1	ADR1_V-L2	ADR1_V-L3				
4	26.11.2009	12:36:00	11853,5	228,4	231,1	230,4				
5	26.11.2009	12:37:00	11854,6	228,9	232,0	230,2				

Total consumed electric energy

Voltages in phases L1, L2, L3

Example of setting of datalogger

	 <p>Go to <i>configuration level</i> by pressing the both indicated arrow keys for time of 3 seconds. On lower display you will see heading Level, on upper display set the required level with the arrow keys Conf and confirm. If the level is secured with password, it appears the display on lower display Password. In this case you are obliged to set the right password and confirm it again.</p>
	<p>You browse with the key  and you choose the menu DlogSet and set !!Edit!! by confirming with the key  you enter the menu for setting of datalogger.</p>
	<p>Select the first unit.</p>
	<p>Set the type of unit (controller Ht40 is set).</p>
	<p>Set the address of unit – controller Ht40 (address 1 is set).</p>
	<p>Select the second unit.</p>
	<p>Set the type of unit (energy meter EM24 is selected).</p>
	<p>Set the address of the unit – meter EM24 (address 2 is set).</p>
	<p>Set the value to be measured by energy meter EM24 (the total consumed energy is set).</p>
<p>...</p>	<p>Proceed in the same way for another units. Maximum number is 16.</p>
	<p>Setting of datalogger is ended by setting the unit UnitType = off. If there is another unit set after this last unit (UnitType = off), this unit is not edited nor measured.</p>
	

5.4 Format of data files

Data transferred to external Flash are recorded in files *.csv.

These files can be opened and read in programs:

- MS Excel (limitation for version 2003 ... max 65536 rows, version 2007 ... max. 1 048 576 rows)
- OpenOffice Calc (showing only 65536 rows)

Description of format of the table

	A	B	C	D	E	F	G	H
1	Ht810							
2								
3	DATE	TIME	ADR1_C1	ADR1_C2	ADR1_C3	ADR1_C4
4	26.11.2009	12:36:00	-22000	-22000	-22000	-22000		
5	26.11.2009	12:37:00	159	276	275	220		

Name of device
Possible to set in **configuration level**, menu **D1logName**.

Date of measurement

Time of measurement

Address of device
Value set by parameter **UnitAddr** in menu „Setting datalogger“ and set on the device too to be monitored.

ADR1_C1

Title of parameter:

- C1 ... measured value in controller or meter Ht100,
- SP1 ... stp point at controller,
- C2 ... 2. input in meter Ht100 or measured value in „Slave 1“ controller,
- ...
- E ... total consumed energy measured by EM24,
- E1, E2, E3, E4 ... consumed energy measured by EM24, tariff 1, 2, 3, 4,
- IW ... average active power measured by EM24,
- V-L1 ... voltage in phase L 1 measured by EM24,
- ...

Measured values
Values <= -22000 means:

- Value not read yet (-22000),
- Measuring input not set (-22000),
- Stp point is OFF (-22000),
- Broken sensor (-22001),
- ...

Number of data for 1 record

Every record in database has the information on date and time of measurement and max. 50 measured registers.

	A	B	C	D	E	F	G	H	I	J
1	Ht81									
2										
3	DATE	TIME	ADR1_C1	ADR1_SP1	ADR2_C1	ADR2_C2	ADR3_E	ADR3_PF1		
4	26.11.2009	12:36:00	158	276	1054	889	5688,5	0,998		
5	26.11.2009	12:37:00	159	276	1058	890	5691,1	0,998		

Date of record

Time of record

Max. 50 measured registers

Each values read out from devices Ht takes always 1 register

Values read out from device Em24:
• E, E1, E2, E3, E4, IW, V-L1, V-L2, V-L3, A-L1, A-L2, A-L3, W-L1, W-L2, W-L3
Take always 2 registers

These values from EM24:
• PF-L1, PF-L2, PF-L3
Take always 1 register

Format of data in Ht100 ... multichannel meter

For the meter Ht100 they are archived the measured values at the input 1 to 10 (by setting). Registers are read from address 20, the values of registers are divided by 10

	A	B	C	D	E	G	H
1	Ht100						
2							
3	DATE	TIME	ADR1_C1	ADR1_C2	ADR1_C3	ADR1_C4	...
4	26.11.2009	12:36:00	158	276	274	221	
5	26.11.2009	12:37:00	159	276	275	220	

Format of measured values – thermal input:

Temperature on display	Temp. In table
158	158
270,4	270

Temperatures are shown in °C

Format of measured values – process input:

Temperature on display	Temp. In table
158	158
12,5	125
34,56	3556
1,887	1887

Value is displayed without decimal point

Format of data in HtInd ... programmable controller

With controller HtIndustry you can archive the measured and stp point values of controller HtIndustry + measured values of „Slave“ controllers. The registers are read from the address 1200 up, the values of registers are divided 10.

	A	B	C	D	E	G	H
1	Ht810						
2							
3	DATE	TIME	ADR1_C1	ADR1_SP1	ADR1_C2	ADR1_C3	...
4	26.11.2009	12:36:00	158	276	274	221	
5	26.11.2009	12:37:00	159	276	275	220	

Formating is the same as for Ht100

Format of data Ht40, Ht60, Ht700 ... controller, meter, ...

For the controllers Ht40, Ht60 and Ht700 they are archived measured and stp point values. Registers 20 a 21 are read out, the values are divided by 10.

	A	B	C	D	E	F	H
1	Ht810						
2							
3	DATE	TIME	ADR1_C1	ADR1_SP1	ADR2_C1	ADR2_SP1	...
4	26.11.2009	12:36:00	273	276	1056	1056	
5	26.11.2009	12:37:00	274	276	1055	1056	

Formating is the same as for Ht100

Format of data - Manual ... manual setting of read register

For devices of Ht line it is possible to set the reading of any register. Into the table it is written the unmodified value of the read register. Thus you can read for example the measured values with decimal point.

	A	B	C	D	E	F	G	H
1	Ht810							
2								
3	DATE	TIME	ADR1_R22	ADR1_R100	ADR1_280	ADR2_R40
4	26.11.2009	12:36:00	273	250	1	0		
5	26.11.2009	12:37:00	274	250	1	0		

Callouts:
 - Device on address 1, register no. 22. (points to C)
 - Device on address 1, register no. 100. (points to D)
 - Device on address 1, register no. 280. (points to E)
 - Device on address 2, register no. 40. (points to F)

Format of data in device EM24 ... energy meter, power analyser

For device EM24 the data are stored in the format stated in the table (see below).

	A	B	C	D	E	F	G	H
1	Ht810							
2								
3	DATE	TIME	ADR1_E	ADR1_V-L1	ADR1_PF-L1	ADR2_E
4	26.11.2009	12:36:00	1855,4	228,3	1,003	3520,4		
5	26.11.2009	12:37:00	1856,1	228,9	1,004	3525,8		

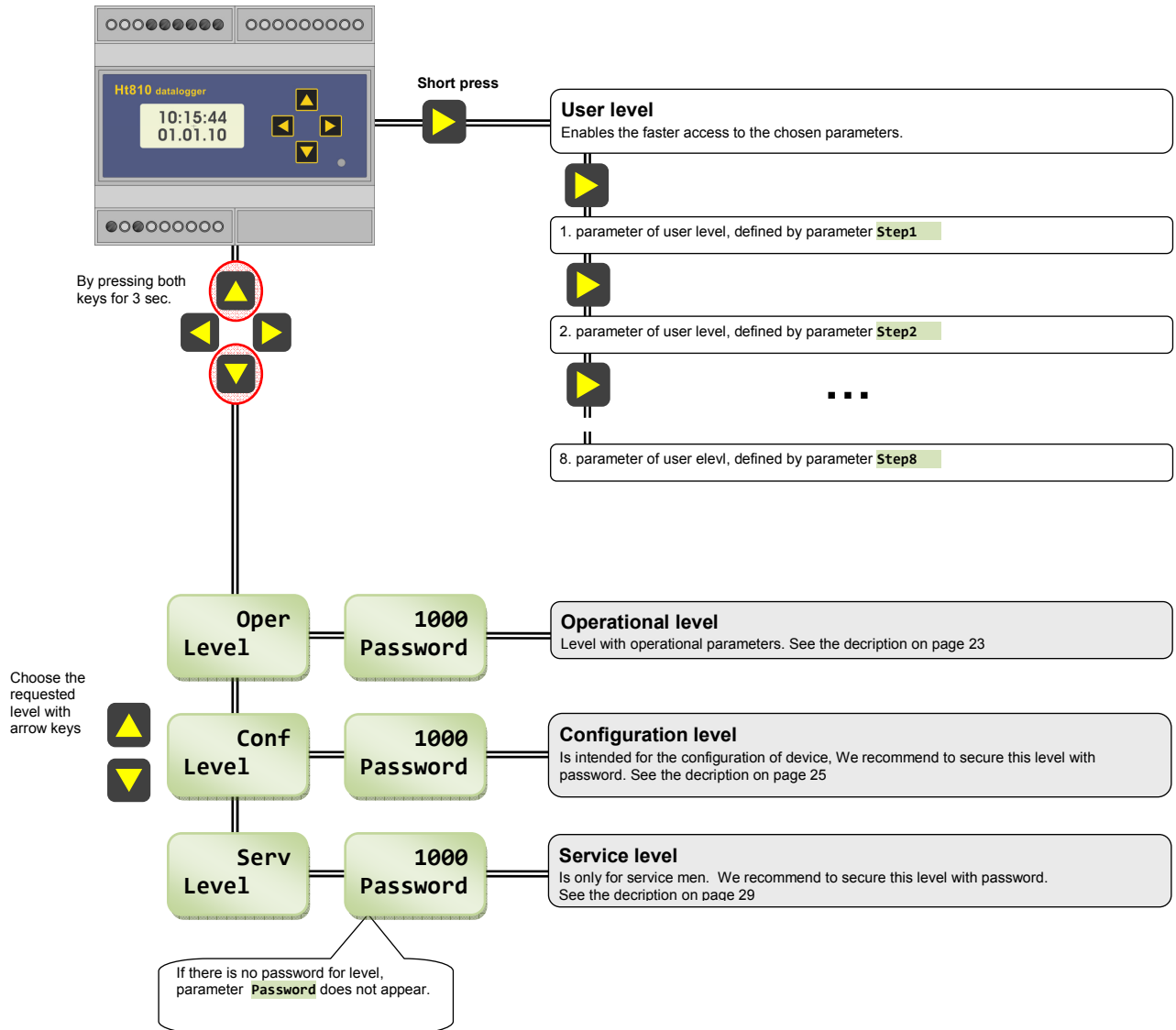
Callouts:
 - Meter EM24 on address 1, consumed energy (points to C)
 - Meter EM24 on address 1, phase voltage L1 (points to D)
 - Meter EM24 on address 1, power factor on phase L1 (points to E)
 - Meter EM24 on address 2, consumed energy (points to F)

Formatting of data from energy meter EM24:

magnitude	description	Format of data [unit]
E	Total consumed energy	xxxxxx,x [kWh]
E1	Consumed energy, tariff 1	xxxxxx,x [kWh]
E2	Consumed energy, tariff 2	xxxxxx,x [kWh]
E3	Consumed energy, tariff 3	xxxxxx,x [kWh]
E4	Consumed energy, tariff 4	xxxxxx,x [kWh]
IW	Average active power	xxxxxx,x [W]
V-L1	Voltage in phase L1	xxxxxx,x [V]
V-L2	Voltage in phase L2	xxxxxx,x [V]
V-L3	Voltage in phase L3	xxxxxx,x [V]
A-L1	Current in phase L1	xxx,xxx [A]
A-L2	Current in phase L2	xxx,xxx [A]
A-L3	Current in phase L3	xxx,xxx [A]
W-L1	Active power, phase L1	xxxxxx,x [W]
W-L2	Active power, phase L2	xxxxxx,x [W]
W-L3	Active power, phase L3	xxxxxx,x [W]
PF-L1	Power factor, phase L1	x,xxx
PF-L2	Power factor, phase L2	x,xxx
PF-L3	Power factor, phase L3	x,xxx

6 Structure of menu






The structure of menu is shown on the following picture.



7 User level

User level is intended for the fast access of user to some parameters. Menu in user level the operator can create himself.

Enter to user level, browse menu of user level

<p>14:38:20 08:12:09</p>	<p>Basic mode of device.</p> <ul style="list-style-type: none"> By pressing the key  you enter to 1. menu of user level.
<p>n.a. ExtFlash</p>	<p>First menu of user level.</p> <ul style="list-style-type: none"> By pressing the key  you enter to the next menu of user level. By pressing the key  you enter to the previous menu of user level.
<p>Stop DataLogg</p>	<p>Second menu of user level.</p> <ul style="list-style-type: none"> By pressing the key  you enter to the next menu of user level. By pressing the key  you enter to the previous menu of user level.
<p>...</p>	

Initial setting of user level

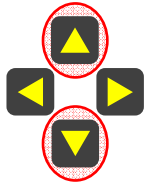
Initial setting of user level is as follows:

- **Step1** = **ExtFlash** ... copying / recording data to external Flash,
- **Step2** = **DataLogg** ... turning ON / OFF of datalogger,
- **Step3** = **Show485** ... showing data from the external devices,
- **Step4** = **NumRec** ... the number of records,
- **Step5** = **FullRec** ... the maximum number of records,
- **Step6** = **CopyRec** ... the number of records copied to external Flash,
- **Step7** = **no** ... no parameter,
- **Step8** = **no** ... no parameter.

Change in setting of user level

Change of setting of user level can be performed in *configuration level*, menu **UserMenu**, parameters **Step1** to **Step8**).

8 Operational level



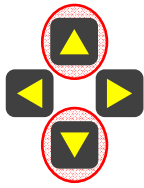
You enter this level by pressing the indicated arrow keys for 3 seconds. On lower display it appears the heading **Level1**, on upper display you select with the arrow keys **Oper** and confirm. If this level is secured with password, it appears on lower display **Password**. In this case you are advised to set the right password and confirm it again.

Menu of operational level

<p>xxx ExtFlash</p>	<p>Copying / recording to external Flash.</p> <p>If there is no copying or recording to external Flash, there are the following options:</p> <ul style="list-style-type: none"> • n.a. ... no action, • Copy ... copying of the memory of datalogger to external Flash, • Record ... recording of the data to external Flash. • • If copying to external FLASH runs, these options are: • Stop ... to end the copying, • Copy ... to carry on with copying to external Flash. • • If recording to external FLASH runs, these options are: • Stop ... to end the recording of data, • Record ... to carry on with recording to external Flash.
<p>xxx DataLogg</p>	<p>Turning ON / OFF of recording to datalogger:</p> <ul style="list-style-type: none"> • Stop ... datalogger is stopped, • Run ... it runs the recording to datalogger.
<p>xxx Memory</p>	<p>Deleting memory of datalogger:</p> <ul style="list-style-type: none"> • n.a. ... no action, • Delete ... deleting the memory of datalogger.
<p>xxx Show485</p>	<p>Enter to menu for showing the measured values of all units connected to line EIA485.</p>
<p>xxx Diag485</p>	<p>Enter to menu for diagnostics of all units connected to that line EIA485.</p>
<p>xxx NumRec</p>	<p>Showing the number of records in datalogger.</p>
<p>xxx FullRec</p>	<p>Showing of maximum number of records in datalogger.</p>

<p>xxx CopyRec</p>	<p>Limitation of records to be transferred from datalogger to external Flash or PC. Range: 1000, 2000, 5000, 10000, 20000, 50000, Full.</p>	
<p>xxx PerRead</p>	<p>Period of reading values from the devices connected: Range: 5 to 120 seconds.</p>	
<p>xxx PerArch</p>	<p>Period of archiving /storage to memory of datalogger or to external Flash. Range: 1 to 60 minutes.</p>	
<p>xxx Clock</p>	<p>Menu for setting the clock:</p>	
	<p>xxx Year</p>	<p>Set the year.</p>
	<p>xxx Month</p>	<p>Set the month.</p>
	<p>xxx Day</p>	<p>Set the day.</p>
	<p>xxx Hour</p>	<p>Set the hour.</p>
	<p>xxx Min</p>	<p>Set the minute.</p>

9 Configuration level



You enter this level by pressing the indicated arrow keys for 3 seconds. On lower display it appears the heading **Level1**, on upper display you select with the arrow keys **Conf** and confirm. If this level is secured with password, it appears on lower display **Password**. In this case you are advised to set the right password and confirm it again.

DlogName ... setting the name of device

Name of device is recorded in files transferred to external Flash or to PC. When you use more devices we recommend to set for each device the different name. Thus the proper identification is secured.

<div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;"> xxx DlogName </div>	Setting of name for datalogger.	
	<div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;"> HT810 DlogName </div>	With help of arrow keys and set the position of cursor. With help of arrow keys and you change the symbol/letter. New name is written after confirming the last letter with the key .

DlogSet ... setting of datalogger

In menu you set what type of devices will be stored into datalogger. Warning *–at any change you delete the memory of datalogger*. If you enter to menu with selection **View**, you can only view the setting (memory of datalogger will not be deleted), in selection **!!Edit!!** you can change the parameters. At every change the memory of datalogger will be deleted.

<div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;"> xxx DlogSet </div>	Enter to menu for viewing, setting datalogger.	
	<ul style="list-style-type: none"> • no ... no enter, • View ... viewing setting of datalogger, • !!Edit!! ... editing of setting of datalogger. At every change you delete the memory. 	
	<div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;"> xxx Unit </div>	Ordinal number of unit (unit/device which is connected to Ht810). Range: 1 to 16.
	<div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;"> xxx UnitType </div>	Type of unit: <ul style="list-style-type: none"> • off ... no unit, • Manual ... manual setting of read registers • Ht100 ... multi-channel meter Ht100, • HtInd ... controller HtIndustry, • Ht40 ... controller Ht40, • Ht60 ... controller Ht60, • Ht700 ... meter/controller Ht700, • Em24 ... energy meter.
	<div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;"> xxx UnitAddr </div>	Address of unit. Range: 1 to 250.
<div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;"> xxx RegAddr </div>	Address of the read register at setting UnitType = Manual . Range: 0 to 3000.	

	xxx Channel	Number of the measured channels for meter Ht100 (UnitType = Ht100). Range: 2, 4, 6, 8, 10.
	xxx Slave	Number of SLAVE controllers connected to MASTER HtIndustry. Parameter is shown at setting UnitType = HtInd . Range: 0 to 10.
	xxx Measure	Value measured by meter EM24: <ul style="list-style-type: none"> • E ... total consumed energy in [kWh], • E1 ... energy in [kWh], tariff 1, • E2 ... energy in [kWh], tariff 2, • E3 ... energy in [kWh], tariff 3, • E4 ... energy in [kWh], tariff 4, • IW ... average active power [W], • V-L1 ... voltage in the phase L1 in [V] • V-L2 ... voltage in the phase L2 in [V] • V-L3 ... voltage in the phase L3 in [V] • A-L1 ... current in the phase L1 in [A] • A-L2 ... current in the phase L2 in [A] • A-L3 ... current in the phase L3 in [A] • W-L1 ... active power in phase L1 in [W] • W-L2 ... active power in phase L2 in [W] • W-L3 ... active power in phase L3 in [W] • PF-L1 ... power factor, phase L1 • PF-L2 ... power factor, phase L2 • PF-L3 ... power factor, phase L3

Comm ... setting of communication lines

Communication line EIA485 is intended for the connection of datalogger Ht810 with monitored devices.
Communication line RS232 is intended for the connection of datalogger Ht810 with PC.

xxx Comm	xxx Baud485	Baudrate of com. line EIA485: <ul style="list-style-type: none"> • 9600 ... 9600 Bd, • 19200 ... 19200 Bd, • 38400 ... 38400 Bd, • 57600 ... 57600 Bd, • 115200 ... 115200 Bd.
	xxx Baud232	Baudrate of com. line EIA232: <ul style="list-style-type: none"> • 9600 ... 9600 Bd, • 19200 ... 19200 Bd, • 38400 ... 38400 Bd, • 57600 ... 57600 Bd, • 115200 ... 115200 Bd.
	xxx Addr232	Address of datalogger Ht810: Range: 251 to 255.

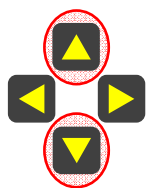
UserMenu ... setting of user menu

<p>XXX UserMenu</p>	<p>XXX Step1</p>	<p>Parameter placed on 1. position of user menu:</p> <ul style="list-style-type: none"> • no ... no parameter, • ExtFlash ... copying / recording to external Flash, • Datalogg ... turning ON / OFF of datalogger, • Memory ... deleting the memory, • Show485 ... showing data from external devices, • Diag485 ... diagnostic of transfer from external devices, • NumRec ... number of stored records, • FullRec ... maximum number of records, • CopyRec ... number of records copied to external Flash, • PerRead ... period of reading values from devices (in seconds), • PerArch ... period of archiving (in minutes), • Clock ... menu for setting the clock.
	<p>XXX Step2</p>	<p>Parameter placed on 2. position, list is the same as in Step1 .</p>
	<p>XXX Step3</p>	<p>Parameter placed on 3. position, same as Step1 .</p>
	<p>XXX Step4</p>	<p>Parameter placed on 4. position, same as Step1 .</p>
	<p>XXX Step5</p>	<p>Parameter placed on 5. position, same as Step1 .</p>
	<p>XXX Step6</p>	<p>Parameter placed on 6. position, same as Step1 .</p>
	<p>XXX Step7</p>	<p>Parameter placed on 7. position, same as Step1 .</p>
	<p>XXX Step8</p>	<p>Parameter placed on 8. position, same as Step1 .</p>

Password ... setting of password for access

<div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;"> xxx Password </div>	<div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;"> xxx PasFlash </div>	Password for copying / recording to external Flash in <i>user level</i> . If it is set OFF , no password is used. Range: OFF , 1 to 9999.
	<div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;"> xxx PassDlog </div>	Password for starting / ending a datalogger in <i>user level</i> . If it is set OFF , no password is used. Range: OFF , 1 až 9999.
	<div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;"> xxx PassMem </div>	Password for deleting the memory of datalogger in <i>user level</i> . If it is set OFF , password is not used. Range: OFF , 1 to 9999.
	<div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;"> xxx PassOper </div>	Password for entering <i>operational level</i> . If it is set OFF , no password is used. Range: OFF , 1 to 9999.
	<div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;"> xxx PassConf </div>	Password for entering <i>configuration level</i> . If it is set OFF , no password is used. Range: OFF , 1 to 9999.
	<div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;"> xxx PassServ </div>	Password for entering <i>service level</i> . If it is set OFF , no password is used. Range: OFF , 1 to 9999.

10 Service level



You enter this level by pressing the indicated arrow keys for 3 seconds. On lower display it appears the heading **Level1**, on upper display you select the proper level with the arrow keys **Serv** and confirm. If this level is secured with password, it appears on lower display **Password**. In this case you are advised to set the right password and confirm it again.

Initial password to service level = 995.

Menu of service level

xxx Ht810Fw	Version of firmware in device.
xxx VinFw	Version of firmware of the unit dedicated for the communication with external Flash
xxx Reset	Writing of initial setting of device: <ul style="list-style-type: none">• no ... no reset.• yes ... reset of all the parameters, you must confirm it 5 x times.

11 Error and information messages

System messages

System messages blink in basic menu.

Err1 xxxxxxxx	Error in configurataion memory.
OverSize Datalogg	On device you have set more records than allowed.
OverTime Eia485	It occurs time slow- down on communication line EIA485
ErrTime Eia485	Exceeding the allowed time for the communication on the line EIA485. Not all data are transferred.

Messages in recording to external Flash

Messages are shown only one time at the time of arise.

NoDisk Warning	NoDisk ... to Ht810 no disc connected.
BadCmd Warning	Bad Command ... wrong command.
CmndFail Warning	Command Fail ... name of file or directory does not exist.
DiskFull Warning	Disk Full ... full disc.
Invalid Warning	Invalid ... invalid command, for example at attempt for writing to the file only for reading.
ReadOnly Warning	Read Only ... the file only for reading.

FileOpen Warning	File Open ... the file is opened.
DirNotEm Warning	Dir not Empty ... attempt to delete the directory that is not empty.
FileInvl Warning	Filename Invalid ... invalid name.
NoData Warning	No Data ... the memory of datalogger is empty.

Message at permanent recording to external Flash

Message is shown only one time, when this occurs.

OK Record	Record to external memory was OK. If the record is not OK, no message appears.
----------------------	-----------------------------------------------------------------------------------

Message at entering the wrong password

Message appears only in user level when you have entered the wrong/bad password for the changing the parameter (parameter must be secured with password). As concerns these parameters:

- **ExtFlash** ... setting copying / recording to external Flash,
- **DataLogg** ... ON / OFF switching for recording to datalogger,
- **Memory** ... deleting the memory in datalogger.

Bad Password	Bad entered password.
-------------------------	-----------------------

12 Installation

Device is intended to be mounted on DIN rail.

Mounting dimensions are - width ... 105 mm, height ... 90 mm, depth ... 58mm.

12.1 Principles of proper installation

In production premises there is a lot of sources of interferences and disturbances. Among the biggest sources are:

- Equipment with inductive load, e.g. elektromotors, coils of relays ...
- Thyristors and other semi-cond. equipment.
- Welding machinery.
- High-current wires and cables.

Making a design of system, try to observe these guidelines:

- All wires of power supply voltage and power wires carrying high currents must be lead separately from signal leads (e.g. thermocouple lead wire, communication lines). Minimum distance between these types of wires should not be smaller than 30 cm.
- If signal and power wires cross each other it is suitable for them to be crossed in right angle.
- At the beginning try to find the possible sources of interference and keep the wires away from them.
- Do not install relays and breakers very close to the controller.
- Do not use supply voltage for the controller also for supplying inductive and phase angle control equipment.
- Twisted and shielded wires should be used for signal leads. Shielding should be earthed several times.

When necessary the uninterruptible power sources (UPS) could be used.

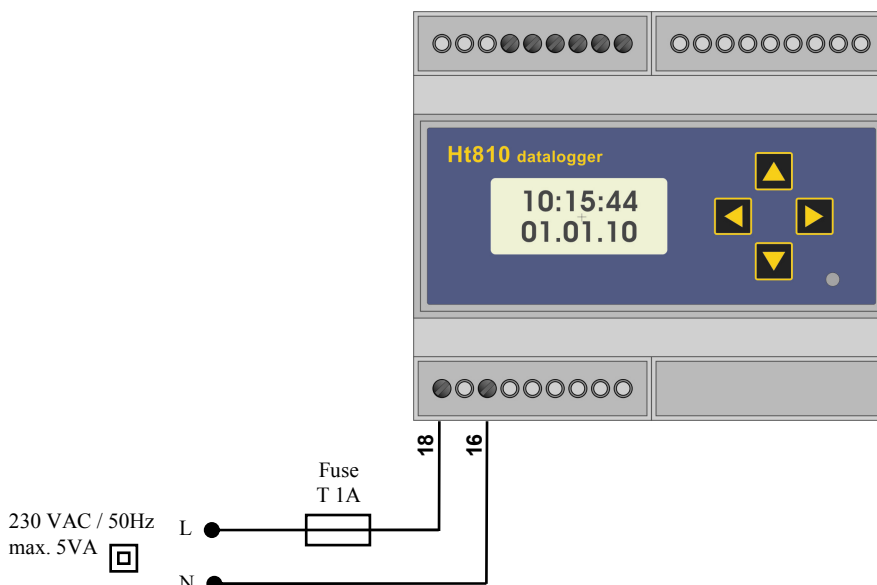
12.2 Electrical wiring

Electrical wiring can be done only by authorised person. The rules must be followed. Improper wiring can cause serious hazards and damages.

Supply voltage

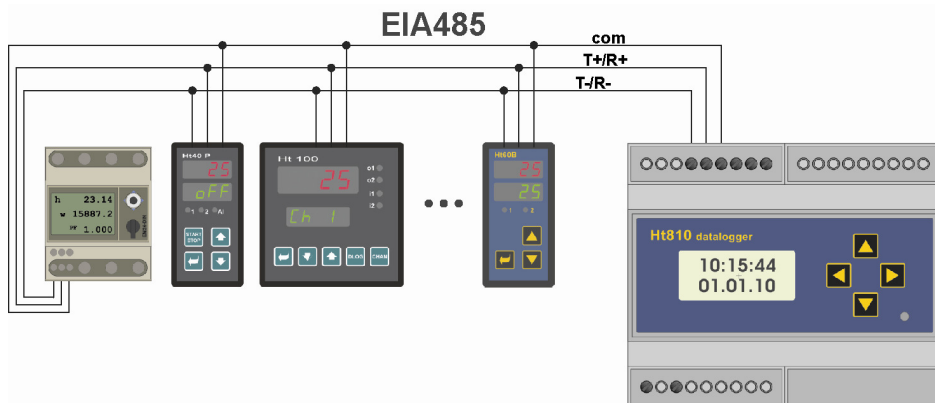
Before you connect the device, check the voltage whether it corresponds to technical conditions.

Devices is intended for use in industrial and laboratory premises. Category of overvoltage II, degree 2.



12.3 Wiring of line „com1“ ... EIA485

The monitored devices are linked to communication line **com 1**. Wiring is described in the following picture.



On each device only 1 sole address can be set (range from 1 to 250).
Datalogger can be set for reading the measured values from max. 16 devices.

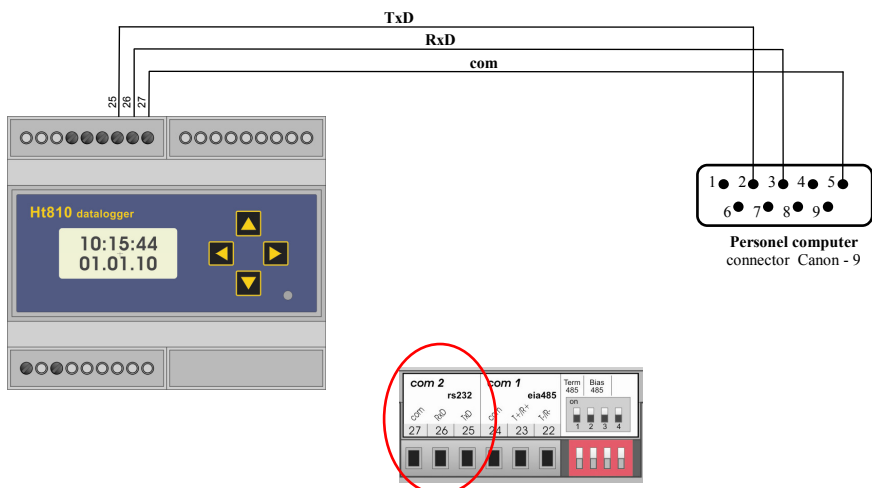
To the line EIA485 these types of devices can be linked:

- **Ht100** ... multi-channel meter,
- **HtIndustry** ... program controller,
- **Ht40** ... devices Ht40A, Ht40B, Ht40P, Ht40T a HtCeramic,
- **Ht60** ... devices Ht60B, Ht60M,
- **Ht700** ... meter / controller Ht700,
- **Em24** ... energy meter.

12.4 Wiring of line „com2“ ... RS232

Communication line „com2“ RS232 is designed for the connection of Ht810 with PC. Through this line you can:

- Communicate with devices on that line „com1 - EIA485“ ... function of convertor (address 1 to 250).
- Communicate with datalogger Ht810 (address 251 to 255).



12.5 Connection with external Flash

The position of USB connector for connection of external Flash memory is described on the picture below.



As an accessory for the device Ht810 it can be supplied the extension cable with the connector for built into the panel.



13 Technical parameters

Device Ht810 is intended for use in industrial or laboratory premises, category of overvoltage, degree II..

Indicators and keys

- LCD display 2 x 8 digits,
- 1 LED diode indicating data recording,
- 4 keys, for controlling.

Memory of datalogger

- memory FLASH independent on supply voltage,
- capacity of memory 64Mbit.

Communication line

- RS 232, protocol Modbus RTU,
- EIA 485, galvanically insulated from the ground of device, protocol Modbus RTU.

Supply voltage

- 230 Vac +/- 10%, 50 Hz, internal slow fuse T2A/250 V,
- input max. 5 VA,
- data stored in the memory independent on the supply voltage.

Operational environment

- 0 to 50 °C,
- 0 to 90 % relative humidity, no condensation.

Transport and storage

- -20 to 70 °C.

Dimensions

- width x height x depth, 105 x 90 x 58 mm,
- weight about 0,5kg,
- device is for DIN rail mounting.

13.1 Warranty

The supplier provides 36-month warranty on defects in material and workmanship on this controller with the exception on defects caused by mechanical or electrical wearing out of the outputs. This warranty does not also apply to damage resulting from inappropriate transportation and storage, misuse, wrong wiring, ambient influences (especially effects of electrical overvoltage, electrical values and temperatures of inadmissible intensity, chemical materials, and mechanical damage) electrical or mechanical overloading of inputs and outputs.

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