

# **TECHNICAL MANUAL - UTI module service tool**

from version 1.9 and higher

Accessory for the UTI-INV-x

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## Application

UTI module service tool allows configuration, control and monitoring of the heating and cooling applications paired with Fujitsu General inverter outdoor units equipped with UTI-INV-x module.

### Operation system requirements

- Windows 7, Windows 8, Windows 10
- USB port

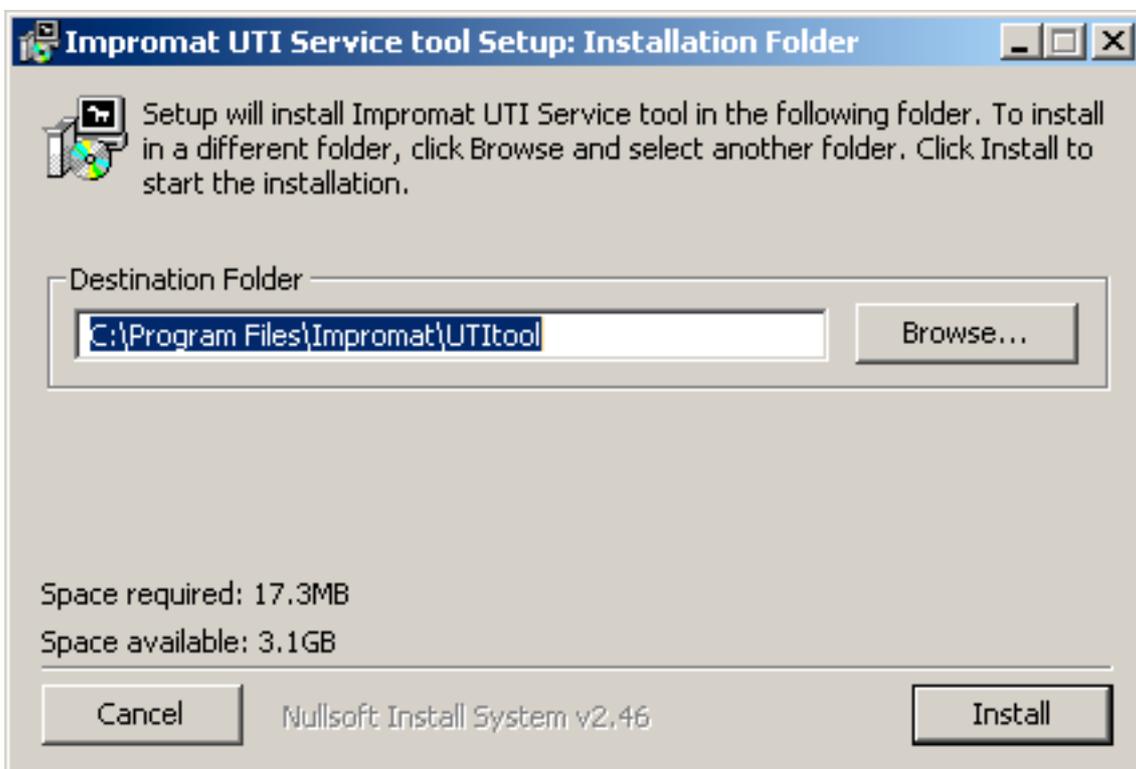
### SETUP

Setup will install following programs:

1. **UTItool** - program for configuration and setting of UTI-INV-x
2. **IChecker Viewer** - software for the offline data view

Postup instalace:

1. On the desired computer run the file "Install.exe" after the setup window pops up, you can choose the Installation folder, default folder is set for C:\Program Files\Impromat\UTItool, we recommend not to change default folder. Run the setup – click on the "Install"
2. After you finish the installation, the software will create UTItool desktop shortcut.



Setup automatically creates in the installation folder the software manual.

### UPDATE

UTItool is automatically updated every time it is started. The update is downloaded from the IMPROMAT KLIMA server. For the update to be successful it is necessary to have a computer connected to the Internet. If your computer does not have a permanent connection, connect it regularly at least once a month. To update the program, it is sufficient to have only a USB cable connected to the computer (it is not necessary to connect the UTI-INV-x control module).

## Software description (UTI-INV-U, W, R32 a W32)

Before you start the software, it is necessary to connect the USB cable UTI-INV-x to the laptop. This cable represents the key which is essential for the software start up. USB cable should be recognized and installed automatically, if not, download and install the windows driver for the USB – RS232 input (usuall CDM21218\_setup).

Run the program by the double clicking on the icon. Once the installation is successfully done and your USB cable is plugged into your laptop, the software will automatically open the splash screen. UTItool has three selectable folders:

1. Parameters – Display of measured values and temperature setting
2. Configuration – Module setting a the option of addressing the temperature probes
3. Chart – Graphical display of measured values

### PARAMETERS - window description

The screenshot displays the 'Parameters' window of the 'UTI module service tool - v1.0'. The interface is organized into several sections:

- Outdoor unit type - status:** Shows 'ADYG09LMCA - OK'.
- System status:** Includes icons for snowflake, radiator, and gears.
- Power:** Displays '0 %' and three sliders set to '100'.
- Exchanger temperature:** Shows '26,8°C' and two sliders set to '5' and '50'.
- Regulation period:** A slider set to '1'.
- Other temperatures:** Shows 'E' at 0,0°C, 'F' at 26,8°C, and 'G' at 0,0°C.
- Indoor temperature:** Shows '26,8°C' and two sliders set to '10' and '40'.
- USB cable:** Shows 'FTY5EK1M USB-RS232 Cable'.
- Heating/cooling water:** Features a row of sliders for outdoor temperatures (-20°C to +20°C) with values 50, 47, 44, 40, 36, 33, and a 'reduction' slider at 0. It also shows 'Total bivalent limit' at -8 and another slider at 6.
- Domestic hot water:** Shows '26,8°C' and sliders for 'Min temperature' (40), 'Max temperature' (50), and 'Time limit' (20). It includes 'Load' and 'Save' buttons and a 'Set' button with a green checkmark.

The bottom of the window has a navigation bar with 'Parameters', 'Configuration', and 'Chart' icons, and the 'IMPROMAT KLIMA' logo in the bottom right corner.

#### Outdoor unit type - status

Type of the applicable outdoor unit (it is necessary to select this type also in the module selection) and a status of the system (type of the error doesn't always correspond to the particular error list. It co-relates only to the new G unit line. Please, always check the error status on the outdoor unit)

## System status

System status according the icons and its meaning:

-  Mode „Heating“
-  Mode „Cooling“
-  Defrost cycle in the heating mode
-  Operation demand (older version = compressor operation)
-  Stop demand (older version = compressor stop)
-  Heating of supply water by heat pump
-  Heating of supply water by bivalent source - low
-  Heating of supply water by bivalent source - high
-  Heating of hot domestic water by heat pump
-  Heating of hot domestic water by electrical heater
-  Mode of reduction (option: timer or external signal)
-  Blocking of the system by high electrical tariff

The following elements show the actual measured values with potential selectable limitations. Setting is applicable only on the values which are not displayed grey via the software ticks or by the rewriting of the value on the keyboard. Before the changing of the values, please take in consideration that it might crucially change the function of the module. Each change has to be saved by the “Set”. The complete setting of the module can be saved by the option “Save” which might be used for the future setting of the new modules by the option “Load”.

## Power

Capacity demand for the outdoor unit. Capacity is shown according to the voltage on the external input or according the internal module regulation (if active). Maximal allowed capacity can be set in the software for the cooling, heating and hot domestic water = capacity limitation.

## Exchanger temperature

Actual measured value on the sensor ETS placed in the mid part of the exchanger. User can set the minimal temperature for the cooling (evaporation temperature of the refrigerant) and maximal temperature in heating mode (condensation temperature of the refrigerant).

## Regulation period

The control speed can be adjusted by changing the time value (the control step is 2.5 seconds times the time constant value).

## Indoor temperature

Actual measured value on the sensor ETS place inside the object. User can set the temperature for the cooling and heating mode.

## USB cable

Type of the plugged cable

## Other temperature

Actual measured value on the three more ETS sensors. These sensors are only informative and can not affect the operation of the system.

### Heating/cooling water

Setting the module as a regulator for the heat pump. Icons show the information and values which can be set or affect the operation.



Outdoor temperature



Desired setting of supply water automatically calculated by the setting of the equithermal curve.



Temperature of the supply/outlet water from the heat pump.



Setting of the equithermal regulation based on the supply water temperature and the outdoor temperature. The curve has to be always declining, otherwise the system will not work properly.



Outdoor temperature which will shut down the heat pump. If the bivalent heating source is present, the selected temperature will start it.



Required temperature for the cooling water



Attenuation for the heating and cooling mode. Once the attenuation is set, the temperature changes according to the actual setting. In heating mode, only the minus/negative values can be set. (Demand for the cooler water). In cooling mode, only the plus/positive values can be set. (Demand for the warmer water)

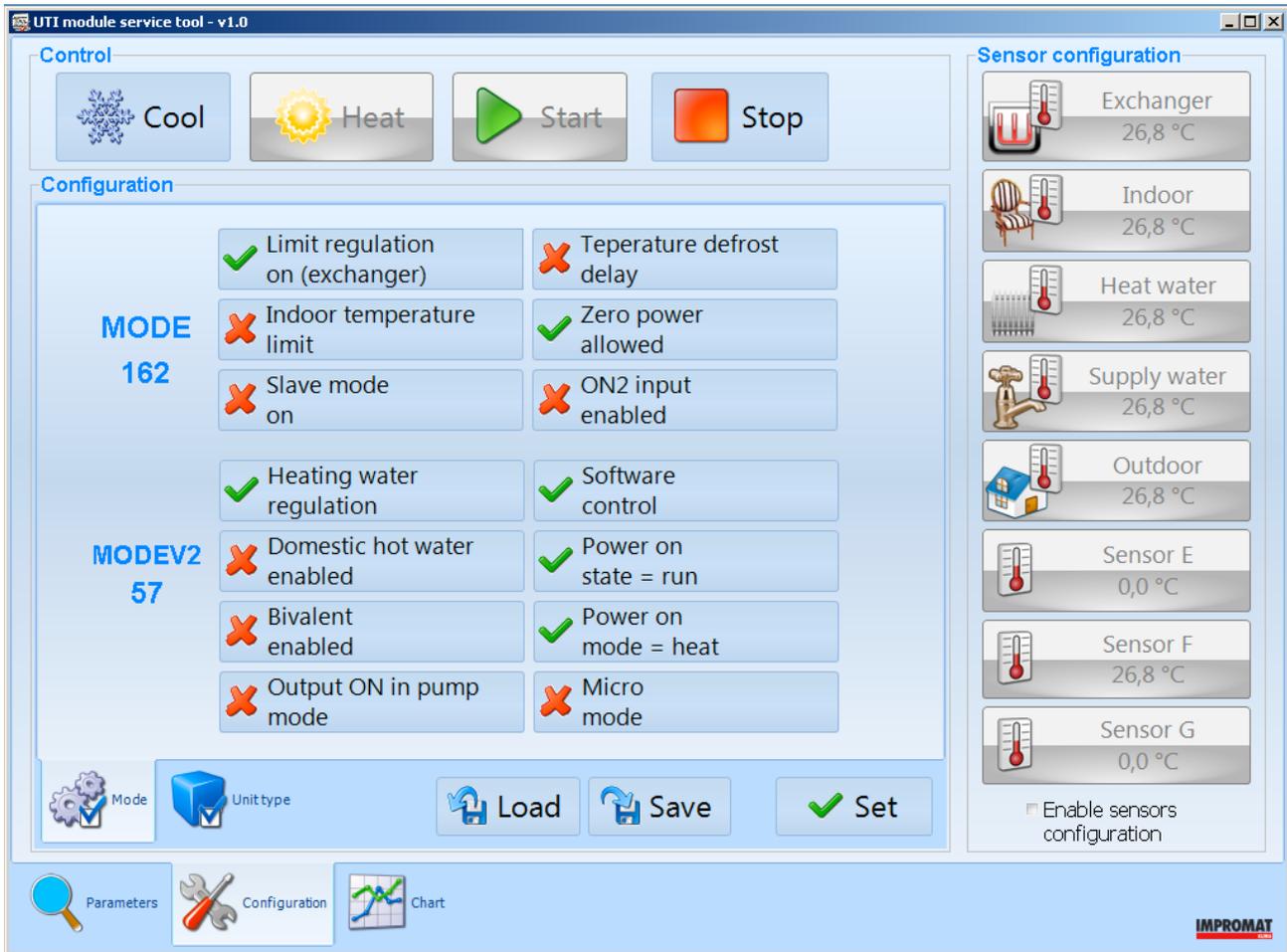
### Domestic hot water

Actual measured value on the sensor ETS placed on the tank of the hot domestic water reservoir. User can define the minimal water temperature value and the temperature of the hot water. (minimal setting has to be always lower than the maximal setting). Clock icon is the setting for the maximal heating of the hot domestic water tank by the heat pump (in minutes). If the set temperature of hot domestic water is not met for defined period of time, the regulator will use the bivalent source to heat the water, meanwhile the heat pump is continue heating the supply water for radiators/floor.

### Total bivalent limit

When the set outdoor temperature is reached, the operation of the outdoor heat pump unit is shut down and the outputs for the electric bivalent source are activated. The outdoor unit will only restart when the outdoor temperature rises above the set temperature.

## CONFIGURATION - windows description



### Control

Function is activated by the clicking on the icon only if the software control is activated. Grey colored buttons shows the active mode. Icon description:

- |   |              |   |           |
|---|--------------|---|-----------|
|  | Cooling mode |  | Operation |
|  | Heating mode |  | Stop      |

### Configuration, folder Mode

Number shown under MODE and MODEV2 is control sum up of the configuration. Each change of the function setting is done by the clicking on the "Set". The complete setting of the module can be saved by the option "Save" which might be used for the future setting of the new modules by the option "Load".

### **Function MODE:**

#### Limit regulation on (exchanger)

After the bottom or upper temperature limit is achieved, this temperature will be kept by the continuous regulation of compressor output.

#### Indoor temperature limit

Activation of limit function of the ETS-B temperature sensor (inner air, heating water etc.) If this function isn't active, it is possible to use the sensor with address B for temperature measurement and display.

#### Temperature defrost delay

how to terminate signal of DEF output:

- **Inactive:** 3 minutes after termination of defrosting cycle. This function is suitable to control heating element (for example heating cable) for heating of outdoor unit tray and drain.
- **Active:** After the temperature +20 °C of the inner air exchanger is reached. It is possible to use operation blocking of the inner fan of AHU units to prevent draught during defrosting. Zero power allowed

#### Zero compressor output is allowed:

- **Active:** Compressor stop is allowed if the output request of internal regulation is lower than the minimal possible compressor output. Basic module setting.
- **Inactive:** Prohibition of compressor stop if the output request of the internal regulation is lower than minimum possible compressor output. Compressor is permanently running with minimum output although its output request is zero.

#### Slave mode on – Slave mode is allowed:

If there are connected two or more outdoor units to one cooling or heating system controlled by the external (superior) regulation, it is possible to connect inputs ON and H/C of all modules parallel. Units adjusted as Slave start to react on input signal 0-10V for output request up to value of 3,0 V. If the signal is 10,0 V the output request for all units is identical 100%.

#### ON2 input enabled

Activation of ON2 input:

- **Inactive:** Signal on ON2 input doesn't affect unit operation.
- **Active:** At voltage of 230 VAC on ON input the internal regulation and outdoor unit operate standardly. At 0 VAC or input disconnection the system reacts in accordance to the actual setting of the module mode:
  1. Micro mode: attenuation – shift of equithermal curve by the value of set attenuation (possibility to control the attenuation for example through an external timer),
  2. Other modes: Stop of the unit (for example by high tariff of electricity).

#### **Function MODEV2:**

##### Heating water regulation

Equithermal regulations is allowed. Temperature of heating water sensed by the ETS-C sensor depends on the temperature of ambient air which is sensed by the ETS-H sensor in accordance to the setting of equithermal curve (see the screen Setup, folder Heat).

##### Supply water enabled

Function of DHW heating is allowed. For this function ATW-EXP expander module must be added to the heat pump.

##### Bivalent enabled

Additional heating source is allowed:

- **Inactive:** Additional source is not allowed.
- **Active:** Additional source is allowed. At the same time the setting „Total bivalent limit“ is activated on Setup screen, folder Heat.

##### Output ON – pump mode (V2+ only)

Setting of the circulation pump control which is connected to the module output ON:

- **Inactive:** Output ON is active only if the compressor is running.
  - **Active:** Output ON is active immediately after the software command Start, no matter if it is allowed to run by input ON. Output ON is active until the software command Stop is sent.
- The flow-switch contact must be connected in serial to input ON.

##### Software control – software control is allowed.

- **Inactive:** Software control Start/Stop and Cool/Heat operations by RS-232 line are prohibited. Module can be controlled by ON and H/C inputs. Message „SW controll prohibited“ is appeared on ATWD control panel display.

- **Active:** Start/Stop and Cool/Heat can be controlled by software through RS-232 line. Capacity request on the ON input must be different from zero. At zero request compressor is stopped immediately (emergency stop). If 0 VDC is on H/C input, then Cool/Heat operation can be switched by software. At voltage of 10-12VDC

Power on state = run

This is information only, there is shown the last status of the module prior the supply is switched off. Never change!

Power on mode = heat

This is information only, there is shown the last status of the module prior the supply is switched off. Never change!

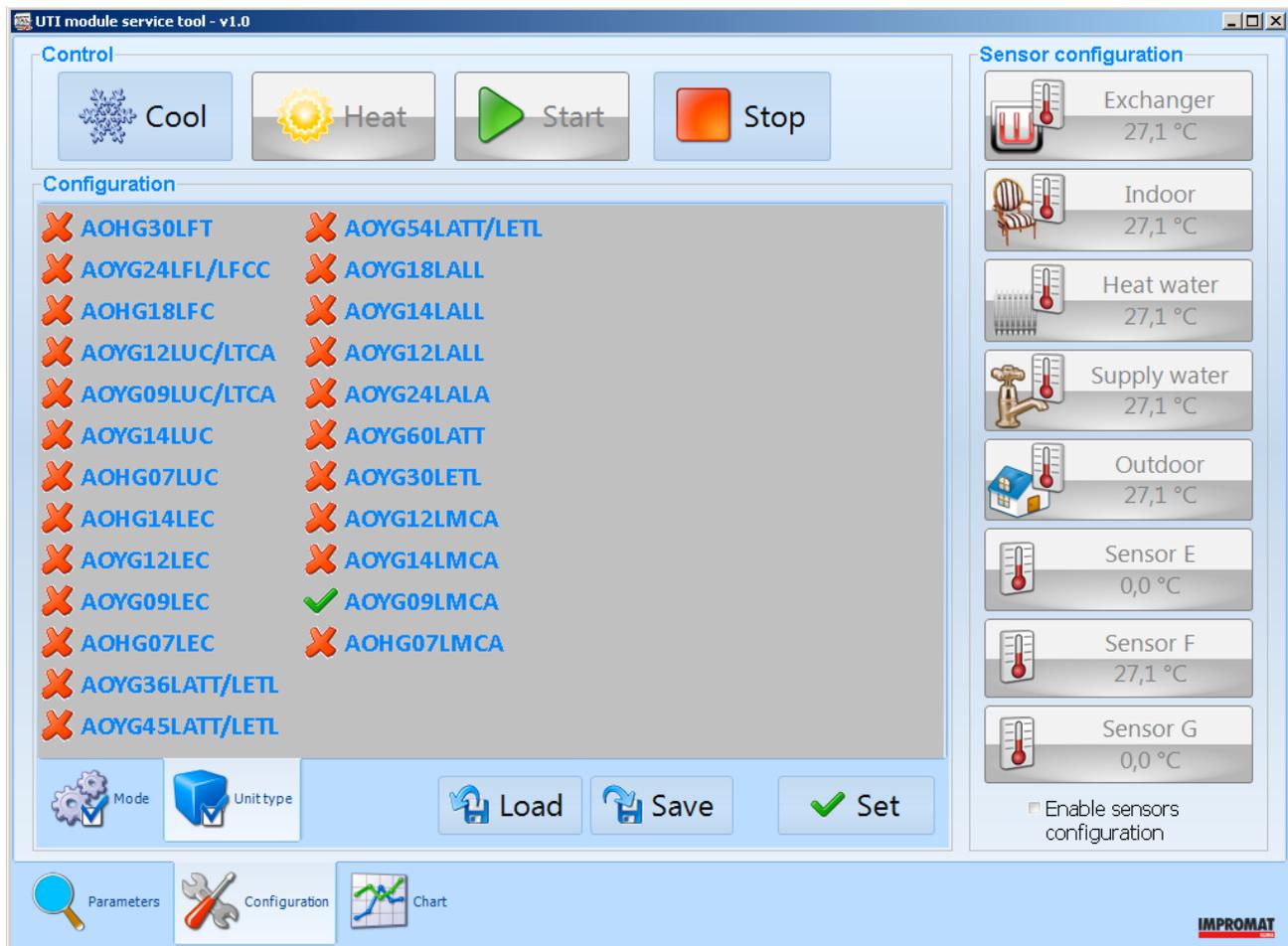
Micro mode

Activation of heat pump function in minimum configuration without usage of ATW-EXP Expander kit:

- single-step control of additional heating source, only (by ERR output on ATW-C-INV module)
- without control of HDW heating
- change of the function input ON2 from blocking to decline (see the screen Factory, folder Mode: ON2 input enabled)

**Configuration, folder Unit type**

For each UTI-INV-U application is necessary to select exact outdoor unit type. Check the outdoor unit model and according the sticker choose the appropriate type in the software selection. Save the selection by the button "Set". If the required type is not listed here, update the program.



**ATTENTION!** Always start with the unit type selection before you do the parameters and mode setting otherwise your recent setting is deleted = module is in factory default.

## Sensor configuration

To ATW-C-INV module there can be connected 1 up 8 digital temperature sensors ETS. Sensors are connected to terminals TH and (GND) in the right part of the terminal box. To terminals on the module it is possible to connect 2 sensors at maximum, to connect higher number of sensors the separate terminal box is necessary to use.

*Note: If is used ATW-EXP expander, you can connect up to 6 ETS sensors through a terminal on it.*



### Sensor-addressing procedure:

1. During function „learning“there must be connected only one sensor to the module.
2. In the software select the option: “Enable sensors configuration”
3. Select the function of the temperature probe
4. Wait approx. 5 second. Once the addressing is successful, the software shows the sensor actual temperature.
5. Disconnect the sensor and do same as described above (only when you want to learn more sensors)
6. Once the addressing process is done, connect all the learnt/existing sensors to the module and check its position and values.

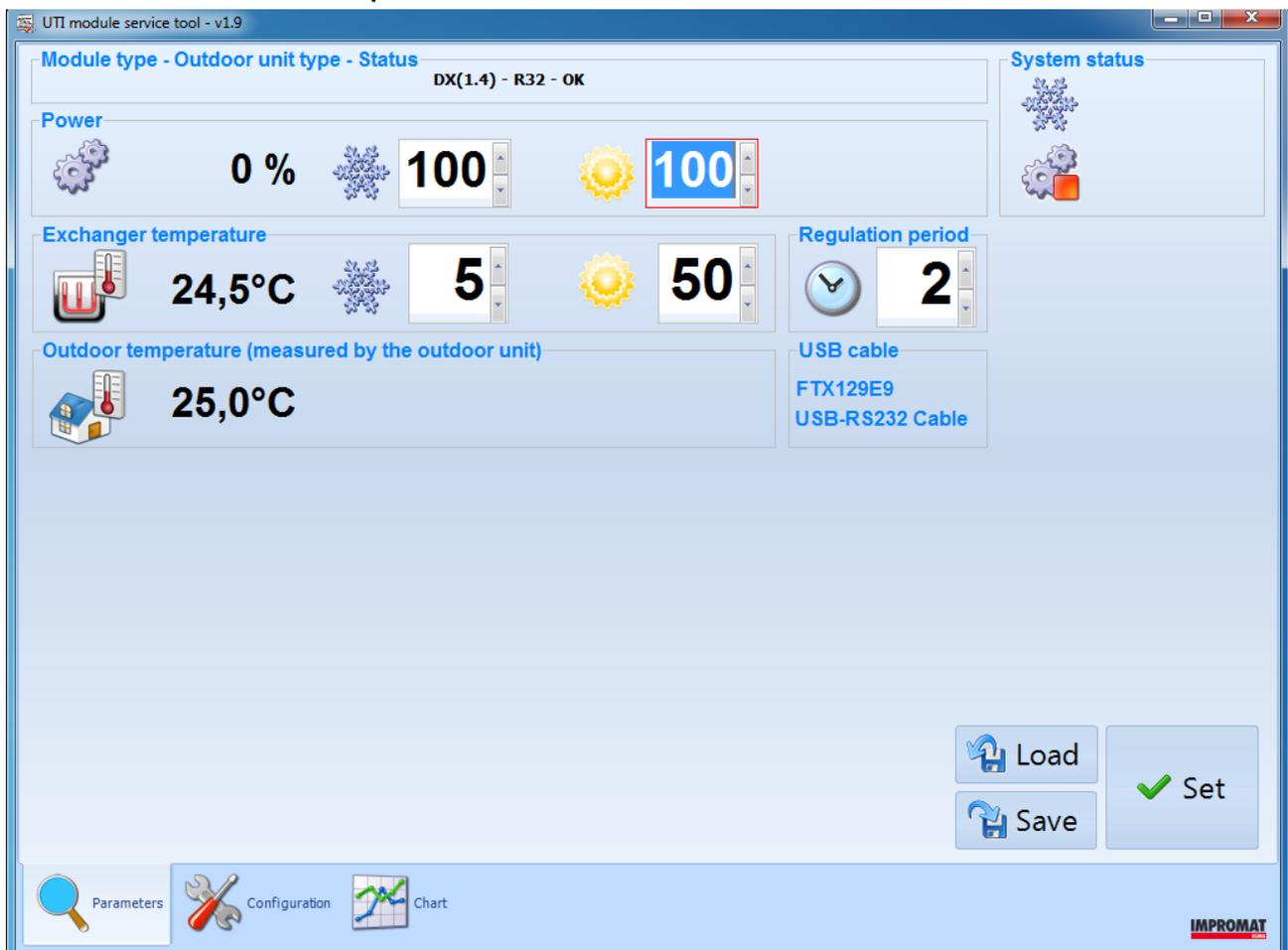
## Software description (UTI-INV-DX)

Before you start the software, it is necessary to connect the USB cable UTI-INV-DX to the laptop. This cable represents the key which is essential for the software start up. USB cable should be recognized and installed automatically, if not, download and install the windows driver (usually CDM21218\_setup).

Run the program by the double clicking on the icon. Once the installation is successfully done and your USB cable is plugged into your laptop, the software will automatically open the splash screen. UTItool has three selectable folders:

1. Parameters – Display of measured values and temperature setting
2. Configuration – Module setting and FW upgrade
3. Chart – Graphical display of measured values

### PARAMETERS - window description



#### Outdoor unit type - status

An item showing the type of outdoor unit and the status of the equipment, including faults.

#### System status

System status according the icons and its meaning::

-  Mode „Heating“
-  Mode „Cooling“
-  Defrost cycle in the heating mode
-  Operation demand (older version = compressor operation)
-  Stop demand (older version = compressor stop)

The following elements show the actual measured values with potential selectable limitations. Setting is applicable only on the values which are not displayed grey via the software ticks or by the rewriting of the value on the keyboard. Before the changing of the values, please take in consideration that it might crucially change the function of the module. Each change has to be saved by the "Set". The complete setting of the module can be saved by the option "Save" which might be used for the future setting of the new modules by the option "Load".

#### Power

Display the current required power per outdoor unit. Power is displayed based on the voltage at the analog input. The software maximum for cooling and heating mode can be set for the power item.

#### Exchanger temperature

Display of the current sensor temperature. For this item, you can set the minimum temperature for cooling mode and the maximum temperature for heating mode.

#### Regulation period

The control speed can be adjusted by changing the time value (the control step is 2.5 seconds times the time constant value).

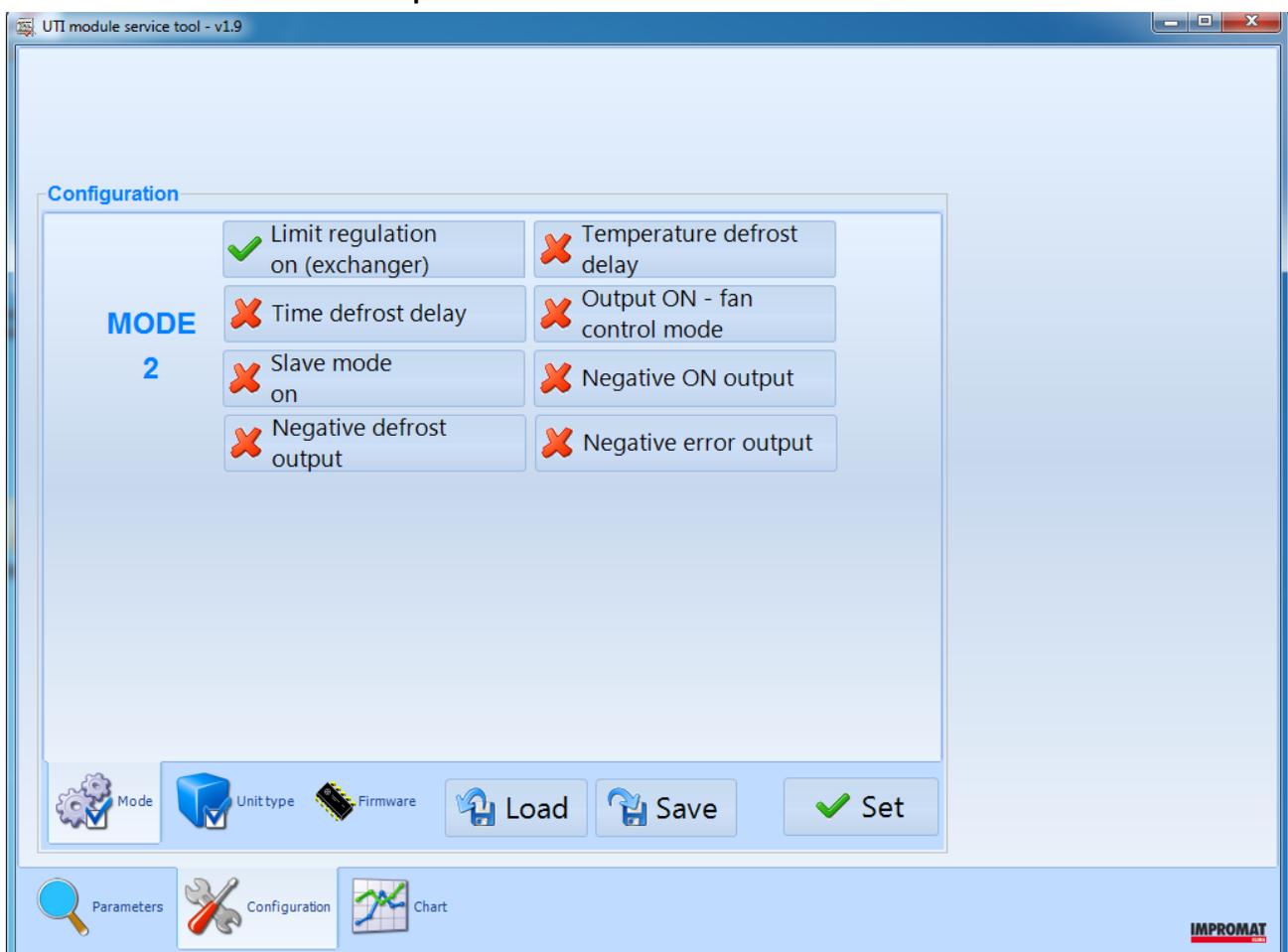
#### Outdoor temperature

Display of the current outdoor sensor temperature measured by the outdoor unit (informative only).

#### USB cable

Type of the plugged cable (informative only).

### CONFIGURATION - window description



### **Configuration, folder Mode**

You can change the values of the following outputs and customize the module behaviour to your installation. The overall setting is evaluated by the MODE checksum. The factory setting is 2, where all modes are set to OFF, except for "Limit regulation on", which is set to ON.

#### Limit regulation on (exchanger)

- ✓ = respects set limits of temperature and capacity, time constant determines the speed of regulation (default 2 = regulatory intervention every 5 sec)
- × = respects only capacity limits, reacts immediately

#### Slave mode on

- ✓ = 3 - 10 V = 0% - 100%
- × = 0 - 10 V = 0% - 100%

The slave mode is used to control two modules with the same analogue signal. The outdoor master unit operates in the basic mode, where the 0 - 10 V analogue input signal linearly generates a power demand of 0% - 100%. The slave starts to operate when the input signal reaches a voltage of + 3V and at + 10V a 100% request is generated.

In addition to parallel connection of inputs, the circuits of all systems must be separated from each other (i.e. each system has its own power and communication cable and its own heat exchanger temperature sensor).

#### Time defrost delay

- ✓ = the defrost relay is still activated 5 minutes after the end of defrost operation
- × = the defrost relay is only activated during the defrost operation

#### Temperature defrost delay

- ✓ = the defrost relay is activated till the HEX reaches 28°C
- × = the defrost relay is only activated during the defrost operation

In case both options are on, the defrost relay is activated till whichever happens first (28°C or 5 minutes)

#### Output ON - fan control mode

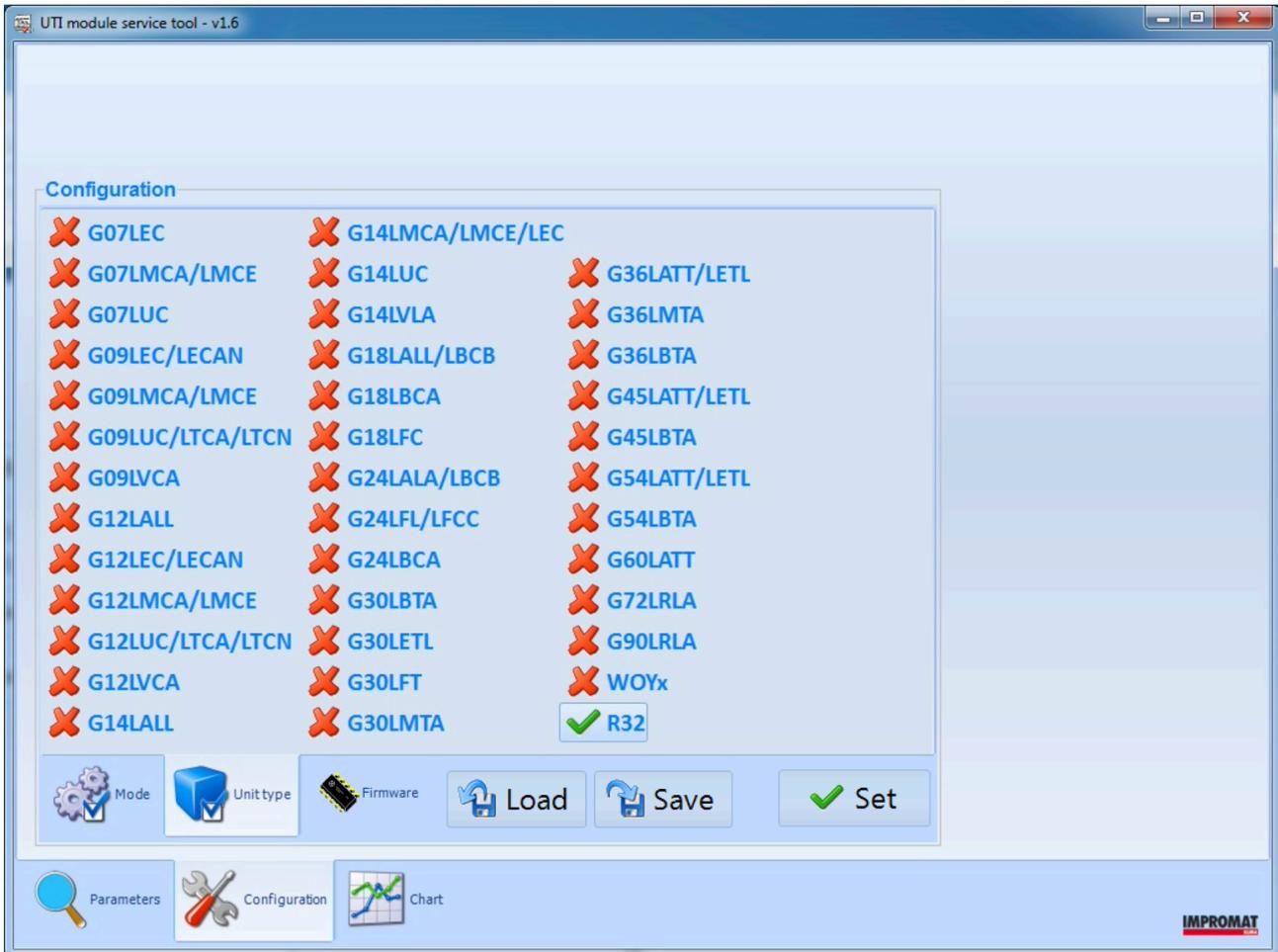
- ✓ = the ON relay is inactive during the defrost operation, and also afterwards, till the HEX reaches 28°C
- × = the ON relay is activated while the unit is running

#### Negative defrost output, Negative error output, Negative ON output

- ✓ = the output relay function is negated (active = disconnected)
- × = standard function of the output relay (active = connected)

### Configuration, folder Unit type

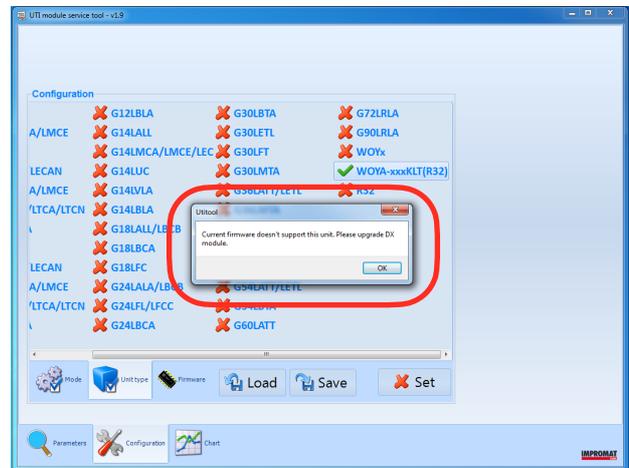
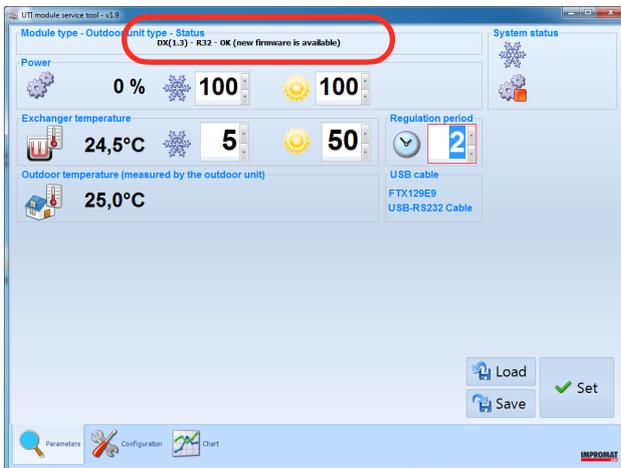
The module's default communication setting is for the AOYG model with R32 refrigerant. For each UTI-INV-DX application is necessary to select exact outdoor unit type. Check the outdoor unit model and according the sticker choose the appropriate type in the software selection. Save the selection by the button "Set". If the required type is not listed here, update the program.



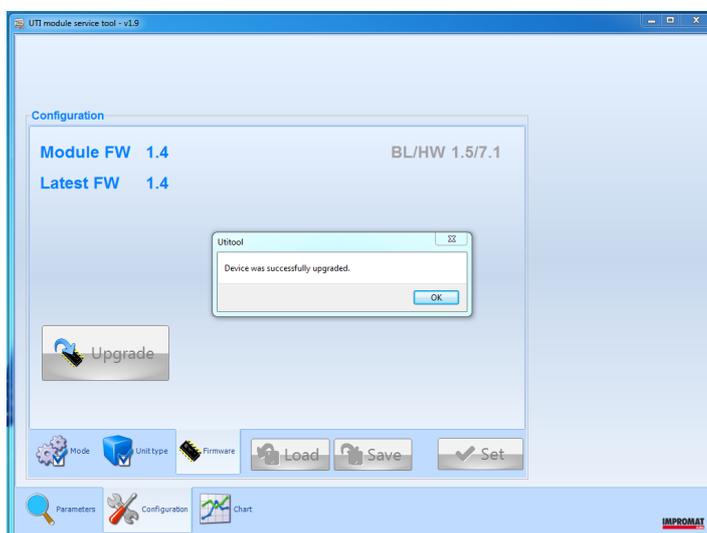
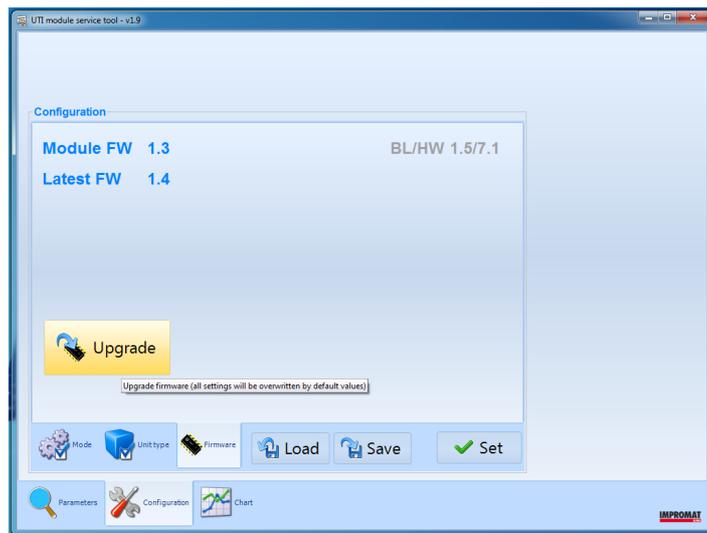
**ATTENTION!** Always start with the unit type selection before you do the parameters and mode setting otherwise your recent setting is deleted = module is in factory default.

## Configuration, folder Firmware

The firmware of the UTI-INV-DX module can be updated using the UTItool program. For this reason it is necessary to keep UTItool always up-to-date. The UTItool program informs about new FW for the module in two ways. Either by information in the status bar on the program's home screen, or by an information window when selecting the type of outdoor unit.



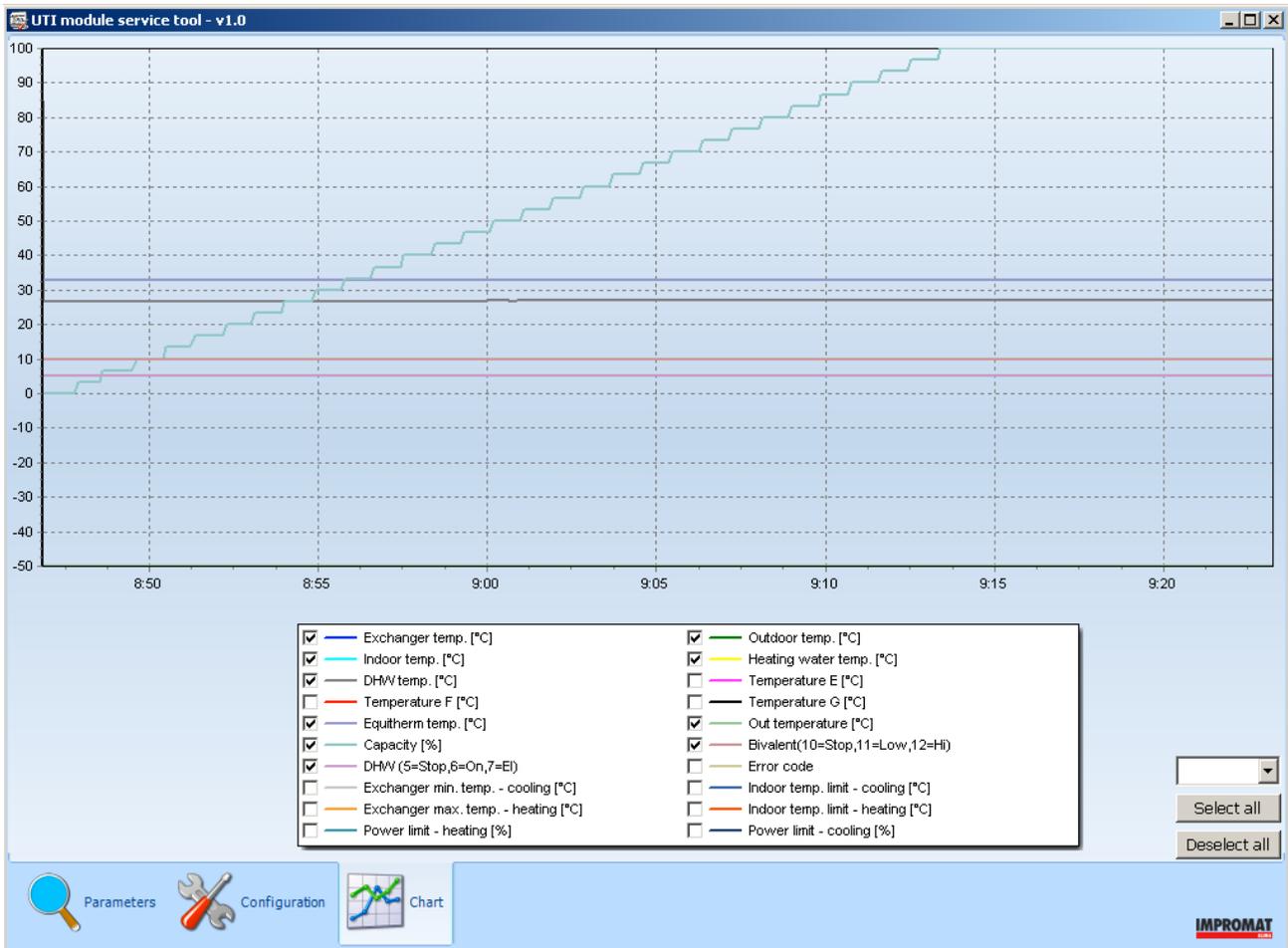
The program is updated via the Configuration menu on the Firmware tab. The program displays the current FW version in the connected module and the latest FW version available on the manufacturer's server. When the Upgrade button is clicked, the FW is downloaded and installed in the module.



## CHART - window description

The graph displays the measured values on the 24h timeline from 00:00 to 24:00.

User can select the values which can be shown, right under the graph or use the predefined selections in the roll up menu in the right corner. The option select or deselect all will show or hide all available values. Each section in the graph can be viewed by the mouse arrow – the measured value will pop up. Zoom in function is performed via mouse by the click and hold to the right bottom corner to the selected area. Zoom out function is performed by the reversed action as described above.

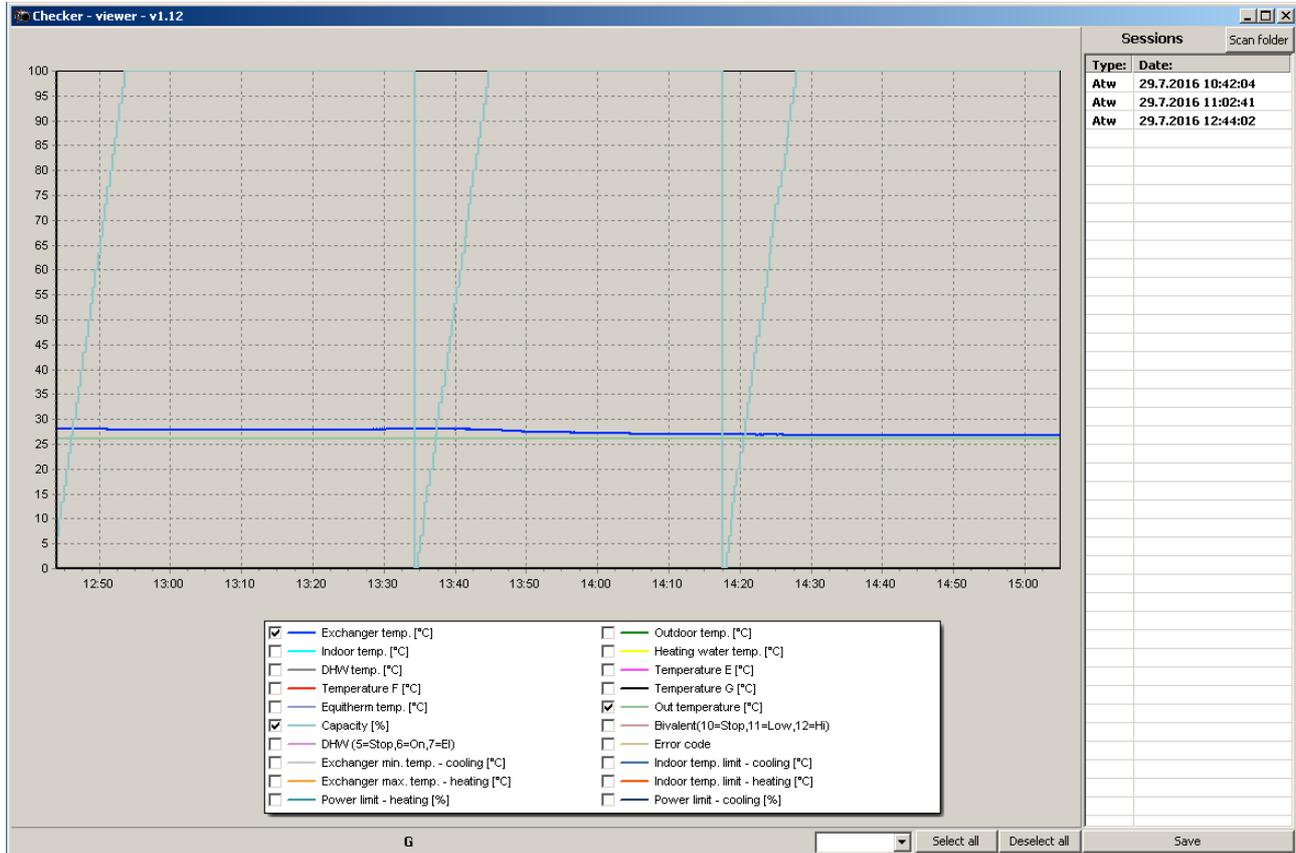


## Saving the operation data

From when the UTI module is plugged in to the computer to the plugging off, the operation data are saved to the file:

*C:\Program Files\Impromat\Checker*

Open the data by double-clicking on the file. The logger (recorded file) is viewed by the additional software IChecker Viewer.



The graph displays the measured values. User can select the values which he wants to be shown in the chart under the graph or use the predefined selections in the roll up menu in the right corner. The option select or deselect all will show or hide all available values.

Each section in the graph can be viewed by the mouse arrow – the measured value will pop up. Zoom in function is performed via mouse by the click and hold to the right bottom corner to the selected area. Zoom out function is performed by the reversed action as described above.

In the right column of the IChecker Viewer is the saved data list. If you have more logs in one folder, you can use the button "Scan folder" which allows you to upload to the current viewer other logs what eliminates further closing and re-opening.

## Preview setting

The saved UTI module setting/configuration can be viewed by the windows explorer preview (preview function has to be enabled in the window setting).

The above mentioned preview solution is used for the quick control = you don't have to upload each file to the UTItool software.

*Attention! The saved setting files cannot be directly opened. It is necessary to upload the file to the UTItool. Please, do not assign any opening software, which might lead to the malfunction of the preview.*

The screenshot shows a Windows Explorer window with the address bar set to 'utidata'. The left sidebar shows the 'Název položky' column with files 'aaa' through 'yyy', and 'hup-hp2' is selected. The main pane displays a preview of the 'hup-hp2' file, which is a UTI-INV-U Settings file. The preview content is as follows:

**Modul - unit type**  
HPU - HP

**Power**  
100 100 100

**Reg. period**  
5

**Exchanger temperature**  
5 50

**Indoor temperature**  
10 40

**Mode**  
Slave mode . . . . . YES  
Temperature defrost delay . . . . . NO  
Zero power allowed . . . . . YES  
ON2 enabled . . . . . NO  
Pump mode . . . . . NO  
Software control . . . . . YES  
Micro mode . . . . . NO

**Heating/cooling water**  
Outdoor -20°C -12°C -4°C +4°C +12°C +20°C reduction  
50 45 40 35 30 25 0

**Total bivalent limit**  
-8 5 0

**Domestic hot water**  
Min temperature 40 Max temperature 50 Time limit 20

File details at the bottom:  
hup-hp2  
UTI-INV-U Settings  
Datum změny: 16.7.2016 19:00  
Velikost: 56 bajtů  
Datum vytvoření: 16.7.2016 20:58