MANDÍK®

AIR CONDITIONING UNIT
MANDÍK

Detail Instructions
for Control and Commissioning

[2014]

Climatix HMI Control   MANDÍK Air Conditioning Unit

1   Introduction

The control system of the Mandík air conditioning units uses a freely programmable PLC controller Climatix from Siemens fulfilling new requirements resulting from technical, technological, ecological and economic needs. This controller belongs among those intended for the control of air handling units that feature the best evaluation. It ensures comfort regulation, safe and energy-efficient operation of air handling equipment and absolute adaptability of the final solution to customer requirements. A non-negligible quality consists of wide communication possibilities enabling easy control and cooperation with most supervisory systems and integration into the systems of technologies of buildings.

The system of measurement and regulation with the Climatix controller offers:

- Excellent capacity-to-price ratio
- Simple installation
- Simple control in several variants
- Local as well as remote control
- Both annual and weekly time program
- Text display with a well-arranged visualisation of all data
- Selection of visualisation on the display in any European language (default setting: Czech)
- Selection of multiple operational modes
- Regulation of temperature and humidity in the inlet or in the area
- Automatic recognition of the need of heating or cooling
- Comprehensive high-precision control of operation of the air handling technology
- A well-arranged listing of alarm messages, including history
- Changes in important parameters only after the entering of the password (more levels)
- Connection of all air handling components to a single system of regulation
- Controlling all standard components of heating and cooling
- Single marking of connection terminals
- Control from the PC with the help of an Internet-based browser (standard delivery) and subsequently from an arbitrary place on the Internet
- Possibility of visualisation of superstructure and cooperation with superstructure systems

2   Control units and room instruments

The HMI control unit for the control of the CLIMATIX controller is intended for informing users about the operational condition of the MANDÍK air conditioning unit, for entering or selection of required values or states and for servicing purposes, especially during commissioning of the air conditioning unit. It consists of a backlit LCD display and function keys. The HMI control panel has three types of design.

For control purposes it is still possible to use the room unit POL822.60, which is intended exclusively for user changes.

2.1 Integrated control unit

Integrated or firm design of the control panel with a display (Fig. 1a) is firmly connected with the controller. It includes four buttons, one of which being navigation, and a four-line display. It is intended for control and for servicing purposes.

Fig. 1a

2.2 HMI -DM Control unit

The portable design (Fig. 1b) has the type identification HMI-DM and it can be used for the control of multiple air conditioning units or it can be firmly installed on the wall in the air conditioned area. It contains four buttons, one of which being navigation, and an eight-line display. It further contains a temperature sensor which can replace the room temperature sensor if the controller is installed in the air-conditioned area. The operation of the unit is signalled with a green diode in the "info" button. A failure is signalled with a flashing red LED in the alarm button. This design of the control unit can be installed up to 700m from the controller of the MaR air conditioning unit and is to be connected with the use of a twisted pair. The control unit is intended for control and servicing purposes. A part of the delivery of the HMI-DM control unit is the Assembly Sheet.

Fig. 1b

2.3 HMI -TM control unit

Its design intended for the door of a metallic switchboard (Fig. 1c) has the type identification HMI-TM and it has two variants: a design for firm integration in the door of a metallic switchboard or a design for free attachment with a magnetic pad. It contains six buttons and a blue-backlit eight-line display. The operation of the unit is signalled with a green diode in the info button. Failure is signalled with a flashing red LED in the alarm button. The control unit is intended for control and for servicing purposes. A part of the delivery of the HMI-TM control unit is the Assembly Sheet.

Fig. 1c

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2.4 Room instrument POL822.60

A separate instrument for the control of the air conditioning unit is the room instrument POL822.60 (Fig. 1d), which is only intended for user operation and is used in a combination with the previous specified methods of control or in combination with the control from a computer through a web interface. It contains six buttons, one of which being navigation, and an LCD display for visualisation of the room temperature or selected temperature, operation modes, fan speed values, current time, failure signalling, etc. The room instrument may be installed up to 700m from the controller of the MaR air conditioning unit and is connected with the use of a twisted pair. Its description and manner of use are provided for in a separate manual. The delivery of the room instrument includes the Assembly Sheet.

Fig. 2d

2.5 HMI@WebControl

HMI@Web Control (Fig. 1e) enables web-based control of the air conditioning unit using a PC with a web browser and Ethernet card. The interface is similar to the interface on the display of the controller or HMI-TM and HMI-DM control units. To access the control features through a web browser, the user has to enter correct controller address in the address field and enter correct login and password afterwards. If the window for entering login data does not appear, the controller address was entered incorrectly.

Default setting of the controller address for HMI@Web access is following:

- Fixed IP address: *192.168.1.42*
- Mask: *255.255.255.0*
- Gateway: *0.0.0.0*

The setting can be changed in the control unit menu ***Device Parameters⇨System***

Parameters⇨Communication⇨ IP-Configuration⇨ Change Settings. To initiate the changes, the changes must be saved by selecting item ***Reset Required !!***.

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In this menu it is also possible to change the HMI@Web login data. Default setting is:

- User name: **ADMIN**
- Password: **SBTAdmin!**

The manufacturer recommends to change the HMI@Web settings by means of one of the control units!

The computer can be connected with the controller directly by an Ethernet cable connected between the Ethernet card and **Ethernet** connector of the controller. Maximum length of the cable is 100 cm depending on the environment. If you are not the PC administrator, ask your administrator to set the controller IP address and PC settings.

The computer can be connected to the controller through LAN network. As in the previous case, the manufacturer recommends to ask the administrator to set the controller IP address and PC settings.

You can access the controller through any PC, tablet or mobile phone with web browser. The integration of HMI@Web controller into local network shall be done by the network administrator!

There are several types of web browsers on the market and to ensure proper communication with HMI@Web control, it is necessary to set the following parameters:

- turn on JavaScript support
- enable cookies
- turn on "Check for newer versions of stored pages every time I visit the page"

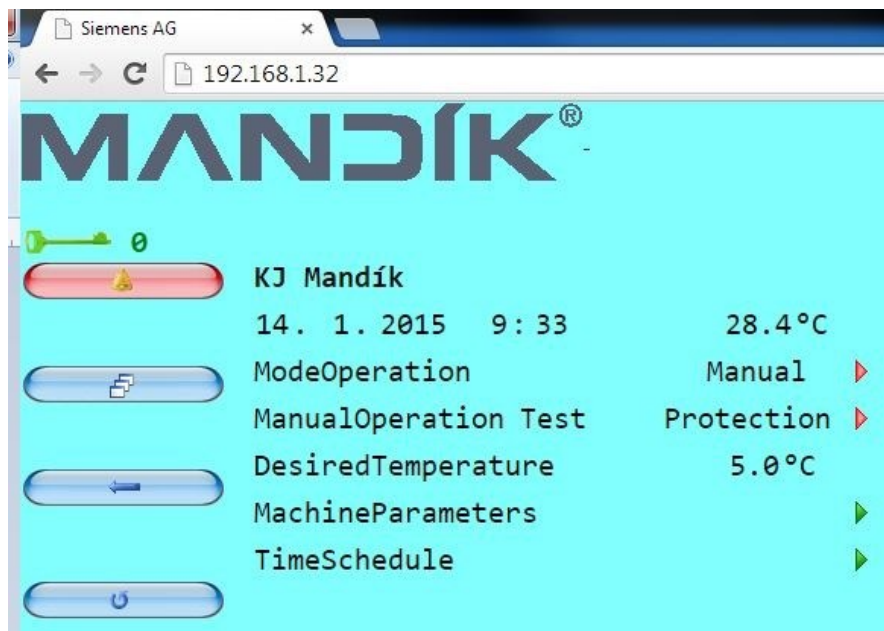Ask your PC or network administrator to carry out the required changes.

Fig. 1e

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3 Description of the control system

3.1 Function buttons

The buttons of the HMI control panel are intended for the control and configuration of parameters of the CLIMATIX controller for the MANDÍK air conditioning unit. Their description and functions are provided for in the following table.

The actual change in the value does not mean its storage in the controller memory. The value must be stored by using the OK or Enter buttons. The cursor position in the menu is signalled with the first flashing sign of the menu. The cursor position is signalled, during the entering of values, by the blinking of the entire value or of the state.

If the HMI control panel is designed as portable, then the insertion of the control panel connector into the CLIMATIX controller in the switchboard is followed by visualisation of the introductory screen. In some applications, the control panel is firmly built in the switchboard and it is not necessary to interconnect the control panel with the controller. The introductory screen will then appear after activation of the controller power supply.

Button	Description
INFO	Going to the **Device parameters** screen or it can be programmed for visualisation of contact information.
ESC	Return in the menu to the next upper level or to the screen beginning. In case of alarms return to the previous screen.
	The first pressing will introduce the screen with the last alarm details; the second pressing displays the screen with a list of current alarms and after pressing for the third time you will see the history of alarms. The screen for alarm administration is introduced for the integrated display.
OK	The rotary button associates the function of selection, function of confirmation and value change. By turning the button you will scroll in the menu or change the value. By pressing the button you will enter the selected menu item or you will confirm the change in the required value. This is not in the HMI-TM design.
Enter	This button is a part of the HMI-TM design only, and it serves for confirmation of the selected menu or confirmation of the value change.
Up, Down	These two buttons are a part of the HMI-TM design only, and they serve for movement in the menu or a change in a value.

Tab. 1

3.2 Introductory screen

A typical introductory screen is displayed in the figure (Fig. 2). The upper part of the display shows the access level (password level), air conditioning unit type and the number of the selected line/number of access lines on the current screen. At the display of the integrated controller, a bell is shown on the end of the first line in case of an alarm. The first row under the line shows the current date, time and temperature according to the

```
KJ Mandík              1/6
25.08.2014  14:05:24  21.3°C
Control           Time-Prog
Mode                Comfort
Required temp.       22.0°C
Time program             ▶
Device parameters        ▶
```

Fig. 2

configuration (space, supplied or exhausted air). The following lines display the basic operating parameters of the unit, which enable the user to control the air conditioning unit.

3.3 Selection: Control

This item makes it possible to choose between the **Remote** operation from the room instrument or supervisory equipment with the help of digital inputs, the operation according to the **Time-Program,** or the operation **Manual**, where the type of operation of the air conditioning unit is selected directly on the control panel. The control from a supervisory control system can still be used as a control mode superior over this mode, with the help of standard communications protocols for the control of buildings, and then it can determine the methods of control as well.

3.4 Selection: Mode

The line **Mode** displays basic information about supplementary or auxiliary mode and the mode which is required from the unit.

o **Supplementary and auxiliary modes** - They start automatically on the basis of preset operating conditions and they cannot be selected directly by the user. Supplementary modes include night ventilation or anti-freeze protection. Auxiliary modes include defrosting of the air conditioning unit, pre-heating, start with low temperature of water taken away, operation with low temperature of water taken away, testing of the unit, etc. For signalization of auxiliary and supplementary modes, the testing mode has the highest priority, followed by auxiliary modes. Supplementary modes have the lowest priority.

o **Operating mode** - The mode can only be changed if **Manual** control is selected. If the **Time-Program** or **Remote** control is selected, the mode is changed automatically according to the time program or command from the room instruments or supervisory equipment. On an attempt for a change with the help of control elements, the message **No user access** will be displayed. The control on the **Remote** option from the room instrument is described in a separate manual to the room instrument. The

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operation possibilities differ according to the configuration of the unit. The user can choose from the following modes, if enabled by the configuration: *Off, Protection, Economy, and Comfort*. The economic mode *Economy* features a lower required temperature and lower fan speed. It is only possible for units with the fans controlled by frequency converters or EC drives. changers. The speed for *Comfort* and *Economy* modes is set in *Device Parameters ⇨Fans*.

3.4.1 Mode: Off

The air conditioning unit is Off in this mode. Only safety functions protecting some parts of the unit from damage can be operational. This mode can only be selected from the room instrument if the *ButtonOffOn* parameter in the menu *Device parameters⇨In/Out assignment⇨ Room instrument* is set to the value *Off*.

3.4.2 Mode: Protection

In this mode, the air conditioning unit is also switched Off, but the function of the frost protection of the area is active. If the room temperature drops below the preset temperature value, the unit will switch on; it will activate heating, open the mixing flap valve and will close the other ones. If the unit does not include a mixing flap valve, the inlet and outlet flaps will open. The unit heats until the required room temperature is achieved. Then it will turn off and again only the safety functions protecting some parts of the unit from damage are operational. This mode is usually used in the winter period if the building remains unused for a long time. The *Protection* mode can only be selected from the room instrument if the *ButtonOffOn* parameter in the menu *Device parameters⇨In/Out assignment⇨ Room instrument* is set to the value *Protection*.

3.4.3 Mode: Economy

In this mode, the air conditioning unit is switched on in the economic mode, featuring lower speed of fans and lower temperatures required. Regulation controls individual components (heating, cooling and humidification) so that it can be possible to achieve the parameters required. This mode is usually used out of the period when people are staying in the building and out of working hours.

3.4.4 Mode: Comfort

In this mode, the air conditioning unit is switched on in the mode when the required fan speed is set to the maximum value and the requested temperature. Regulation controls individual components (heating, cooling and humidification) so that it can be possible to achieve the parameters required. This mode is usually used when people are staying in the building and during working hours.

3.5 Required temperature

The value corresponds to the selected mode *(Off, Protection, Economy, Comfort)*. The values

of the required temperature for the given mode are set in the menu ***Device parameters⇨Temperatures*** in the variables ***Comfort***, ***Economy***, ***Protection***. In the ***Off*** mode, 0.0°C will be displayed.

3.6 Time program

This item will display the menu with time programs: ***Daily program***, ***Weekly program*** and ***Yearly program*** (Fig. 3). It applies that the yearly program is the supervisory program for both weekly and daily programs and the weekly program is the supervisory program for a daily program. The decision whether the air conditioning unit is to be controlled according to a time program is made in the ***Control*** selection.

Time program	1/3
Daily program	▶
Weekly program	▶
Yearly program	▶

Fig. 3

3.6.1 Daily program

It contains at least ten daily time points for selection of the state of the air conditioning unit (Fig. 4). The entering of a daily time point consists of the entering of the starting time in the form ***hh:mm***, followed by the actual mode (***Off / Protection / Economy / Comfort***) or required temperature and validity of the time point (***No/Yes)***.

Daily program		1/10
06:00	Comfort	Yes
18:00	Off	Yes
18:00	Off	No
18:00	Off	No
18:00	Off	No

Fig. 4

The daily time program features the lowest priority, which means that the air conditioning unit will be governed by the daily program, until the occurrence of a time section in which a weekly or yearly time program has simultaneous validity. On a standard basis, the daily program is used to define the function of the unit during ordinary working or occupancy days.

3.6.2 Weekly program

It contains at least ten time sections in the week for selection (Fig. 5). The entering of a time section consists of the entering of the beginning of a time section in the form ***dd hh:mm*** *(day, hour and minute)*, the entering of the end of the time section in the form ***dd hh:mm*** *(day, hour and minute),* followed by the actual mode (***Off / Protection / Economy / Comfort***) and validity of the time section (***No/Yes)***.

Weekly program			1/10
Sa 08:00	Su 15:00	Economy	Yes
Sa 06:00	Su 18:00	Off	No
Sa 06:00	Su 18:00	Off	No
Sa 06:00	Su 18:00	Off	No
Sa 06:00	Su 18:00	Off	No

Fig. 5

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A weekly time program features a higher priority than the daily program, but a lower one than the yearly program. This means that the air conditioning unit will be governed by a weekly program until the occurrence of a time section in which a yearly time program has simultaneous validity, independently of the fact what is entered for that time section in the daily program. On a standard basis, the weekly program is used to define the function of the unit for atypical working or occupancy days during the week or for weekends.

3.6.3 Yearly program

It contains at least ten time sections in the year for the mode selection. The entering of a time section consists of the entering of the beginning of a time section in the form **dd.mm hh:mm** *(day, month, hour and minute)*, the entering of the end of the time section in the form **dd.mm hh:mm)**, followed by the actual mode (***Off/Protection/Economy/Comfort***) and validity of the time section (***No/Yes)***.

Yearly program			1/10
31.01 06::00	31.12 18::00	Off	No
31.01 06::00	31.12 18::00	Off	No
31.01 06::00	31.12 18::00	Off	No
31.01 06::00	31.12 18::00	Off	No
31.01 06::00	31.12 18::00	Off	No

Fig. 6

A yearly time program features the highest priority. This means that the air conditioning unit will be governed, for the specified time section, by the yearly time program, independently of the fact what is entered for that time section in the weekly time program or in the daily time program. On a standard basis, the yearly program is used to define the function of the unit for atypical days in the year, such as bank holidays or company holidays.

3.7 Device parameters

In the device parameters equipment (Fig. 7) it is possible to monitor the state of the unit and its individual components, to make configuration of the unit, change some operation values, test the unit during commissioning and to determine the next yearly servicing inspection, in particular for configurations with a gas exchanger. The menu items ***Configuration, Device testing, Inputs and outputs, In/Out assignment*** and ***System Parameters*** are only accessible in the servicing mode after the password input.

Device parameters	1/9
Temperature	►
Components	►
Configuration	►
Device testing	►
Inputs and outputs	►
In/Out assignment	►
System objects	►
Enter the password	►
Next servicing	
6.9.2014	

Fig. 7

3.7.1 Temperatures

This menu contains information on requested and measured temperatures. It displays an informative overview of all current temperatures according to the configuration (Fig. 8).

Temperatures	1/15
Comfort	22.0°C
Economy	18.0°C
Protection	5.0°C
Room temperature	21.3°C
Correction	0.0°C
Inlet temperature	25.9°C
Correction	0.0°C
Flue gas temperature	145.0°C
Correction	0.0°C
Outdoor temperature	14.6°C
Correction	0.0°C

Fig. 8

➢ *Comfort* (°C) – temperature required for the *Comfort* mode.

➢ *Economy* (°C) – temperature required for the *Economy* mode.

➢ *Protection* (°C) – temperature required for the *Protection* mode.

➢ *Room temperature* – If the sensor is configured, then it should be placed in the area which is the target of the air conditioning, in order to avoid the influencing of the measured temperature by local influences, such as radiators, sunshine passing through windows, etc. On a standard basis, a room instrument with an integrated temperature sensor is delivered or it is possible to deliver the QAA2030 sensor from Siemens with a measuring element NTC10k. If not configured, it may be replaced by the sensor of the temperature of inlet or outlet air. It is also possible to install more room sensors and the resulting room temperature is given by the *MoreRoomSensors* parameter.

➢ *Inlet temperature* – this sensor is configured in most cases and must always be placed downstream of the last heating or cooling component, upstream of the air entry into the area. Maximum temperature in the duct is determined, on the basis of sanitary and fire regulations, at 50°C. On a standard basis, the QAM2130 sensor from Siemens is delivered with the NTC10k measurement element. This sensor should always be configured.

➢ *Outlet temperature* – this sensor is configured in many cases as a replacement for the room temperature sensor, because it reads the temperature without being affected by local influences of the areas. It is installed in the outlet duct. On a standard basis, the QAM2130 sensor from Siemens with the NTC10k measurement element is delivered.

➢ *Outdoor temperature* – it should be configured as well for all air conditioning units, in order to ensure the correct function of the control system, especially during the starting up of the unit or its outage. The sensor should be installed in the outdoor environment in such a way that it can be protected from weather impacts, which could have adverse influences on the regulation system. For example, through direct sunshine, rain, frost deposit, wind, etc. On a standard basis, the QAC2030 sensor from Siemens is delivered with the NTC10k measurement element. It is also possible to use the QAM2130 sensor in case of the sensor installation into or in front of the louvers of the inlet flap valve. The outdoor sensor is also used for the control of air circulation with the help of the mixing flap valve. This sensor should always be configured, because it is often linked with protection functions and start-up functions.

➢ *Heating water* – this sensor must be configured in case that the unit contains a water heater because it ensures correct function and protection of the water exchanger. It is installed on the return water from the heater, the so-called return pipe so that it can measure the actual temperature of the heating water taken away. On a standard basis, the QAD36/101 sensor from Siemens is supplied with the NTC10k measurement element.

➢ *Cooling water* – this sensor can be configured in case that the unit contains a water cooler. It is installed on the return water from the cooler, the so-called return pipe so that it can measure the actual temperature of the cooling water taken away. On a standard basis, the QAD36/101 sensor from Siemens is supplied with the NTC10k measurement element.

➢ *Flue gas temperature* – this sensor must be configured in case that the unit contains a gas heater, because it ensures correct function and protection of the gas exchanger, including the emergency function. It is also used for the control of the bypass flap valve of the gas exchanger for condensation mitigation. The temperature sensor is installed in the pit welded above the footing of the flue gas ducting. On a standard basis, the QAZ21.5120 sensor from Siemens is supplied with the NI1000 measurement element.

➢ *Downstream of the recuperator* – this sensor can be configured in case that the unit contains a recuperator because it ensures the correct function of the recuperator, including the emergency function. The temperature sensor is installed downstream of the recuperator on the outlet. On a standard basis, the QAM2130 sensor from Siemens is supplied with the NTC10k measurement element.

The following values are displayed for each temperature sensor:

o *Temperature* (°C) – It states the temperature in the sensor installation place. If the temperature value is smaller than -100°C, then the inlet cable was probably short-circuited or the actual measuring element was short-circuited. If the temperature exceeds 300°C, then the inlet cable or the actual measuring element was probably interrupted. In the case of a non-stable value, a foreign signal is probably induced into the inlet cable. A possible failure is signalled with the bell symbol on the LCD display or an alarm is signalled by a flashing or lighting diode and with a message in the list of alarms.

o *Correction (°C)* – this is a parameter, whereby the user can change the value stated by the sensor and perform a modification of the temperature deviation arising for example through the cable length. According to local conditions it is possible to perform sensor correction, but only if the servicing password has been entered previously.

The text below includes settings associated with operation of the air conditioning unit on the basis of temperatures and they are accessible also after the entering of the access password.

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➢ **MoreRoomSensors (Average/Max/Min/1/2/3/4)** – in case of multiple room temperature sensors it determines in what way the final room temperature will be calculated or assigned. In case of selection of 1, 2, 3, 4 the final room temperature is given only by the selected sensor and the other sensors serve for informative purposes only.

➢ **ClimaDeadBand (°C)** – Used to determine the temperature limits, within which the unit shall carry out heating or cooling. It is the zone of insensitiveness around the required temperature within which no change from **heating** to **cooling** and vice versa will occur.

The unit is heating if: **ClimaTemperature** (Reference temperature) < **Temperature required – ClimaDeadBand / 2**.

The unit is cooling if: **ClimaTemperature** (Reference temperature)> **Temperature required + ClimaDeadBand / 2**.

➢ **ClimaTemperature (Room/Supplied/Removed)** – It selects the temperature sensor according to which the controller decides whether the unit shall heat or cool. It is possible to choose the room temperature sensor, inlet air or outlet air temperature sensors.

➢ **Display (Room/Supplied/Removed)** – It selects the temperature sensor whose value is to be visualised on the first line of the introductory screen. On a standard basis, the system selects the reference temperature sensor which is compared with the required temperature. It is possible to choose the room temperature sensor, inlet air or outlet air temperature sensors.

➢ **State (Off/Heat/Cool)** – informs about whether there is a request for heating or cooling.

The request is created according to the difference between required and reference temperature or comparison of the temperature of air supplied and cascade regulation limit values MinTemperature and MaxTemperature.

The unit is **heating** if:

- **ClimaTemperature** (Reference temperature) < **Temperature required – ClimaDeadBand / 2**.
- **TemperatureSupplied < MinTemperature** (cascade regulation limit value)

The unit is **cooling** if:

- **ClimaTemperature** (Reference temperature)> **Temperature required + ClimaDeadBand / 2.**
- **TemperatureSupplied > MaxTemperature** (cascade regulation limit value)

➢ **Summer*Winter** – it indicates the state which was diagnosed by the controller on the basis of comparison of the outdoor temperature with a decisive temperature (16°C as a standard) for a certain time period. These values are stated on the next line. If the temperature is smaller for the time specified, then the **Winter** state is activated, and if it is greater for that time, the **Summer** state is indicated. This state governs the method of the unit start-up, e.g. the recuperator function.

➢ **Winter start** – It states the time for which a 100% capacity of heating is required on the starting

of the unit in the evaluated **Winter** state.

3.7.2 Components

In the item ***Components*** (Fig. 9), the menu with individual components of the air conditioning units will be visualised, these components being ***Fans, Burner, Electrical heating, Water heating, Cooler, Recuperator, Flap valves, Filters, Cascade regulation*** and others, depending on the configuration of the unit. The current state of each component is displayed, if the information is of practical importance. By choosing them it is possible to display, in the user mode, basic information on the

Components	1/7
Fans	▶
Burner	▶
Cooler	▶
Recuperator	▶
Cascade regulator	▶
Flap valves	▶
Filters	▶

Fig. 9

state of the component of the unit. In the servicing mode it is possible to perform a change in the setting of their parameters. The basic information which is accessible without entering a password is as follows:

o ***State*** (%, Off/On) – It informs about the fact whether the devices are On and possibly what requirement for capacity in percentage is sent for the device to the frequency converter. Maximum speed (100%) is set in the frequency converter parameters according to the technical specification of the air conditioning unit.

o ***Operation hours*** – They can serve as information for servicing staff with regard to the wear and tear of the fan or other components.

o ***Number of starts*** – It indicates the method of the unit operation. A large number of starts may signal an incorrect function of the entire air conditioning unit.

o ***Number of failures*** – A major number of failures signals to the operators that they should deal with their reason and search for their cause.

o ***Release*** – it is the information about fulfilment of the conditions for the starting of the equipment on the basis of the selected mode, if it makes sense for the equipment in question. If all conditions are fulfilled, the standard release value is 15. If the value is higher, there arose a requirement for the equipment activation on the basis of a supervisory function, such as poor air quality, excessive temperature difference between the required and supplied temperature, etc. If the value is smaller, the devices will not start up. The tables of the conditions for the release of fans and other equipment are in Table 3 and Table 4 at the end of this documentation.

o ***PID-Control*** – Contains values determining the quality and speed of control. The values are factory-set and they can be changed only by person with appropriate knowledge in the field of control systems. The individual variables are described below:

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- **PID-Control (GESP/OG/UG/REG/Y-NVA)** – Control state of the PID controller, accessible without password. The individual states are described below:
  - **GESP** – the controller is not enabled,
  - **OG** – forced maximum output **O,**
  - **UG** – forced minimum output **O,**
  - **REG** – the controller is active,
  - **Y-NV** – the value required **S** is invalid,
  - **UDEF** – the value required **S** is invalid.
- **S (°C)** – value required, not password protected.
- **P (°C)** – current value, not password protected.
- **O (% or °C)** - PID controller output, not password protected.
- **TI (s)** – integration component, password protected.
- **KP** – proportional constant, password protected.
- **TD (s)** – derivation component, password protected.

PID-Control values are accessible only for some components.

3.7.2.1 Fans

The item "**Fans**" (Fig. 10) contains information on the way of operation of the fan or fans. Fans are controlled, on a standard basis, by drives with frequency converters or the so-called EC drives. Protection of the drives is in this case ensured by a contact of the frequency converter or the EC drive. The maximum and minimum speed values are set for the drives controlled by the

Fans		1/5
State	89%	On
Operation hours		0
Number of starts		0
Number of failures		0
Comfort 100% Economy 80%		

Fig. 10

frequency converters in the parameters of frequency converters according to the technical specification of the air conditioning unit. Speed is then controlled from the controller in the extent from minimum (0%) to maximum (100%) speed values set in frequency converters. For the EC drives, speed values are controlled from the controller in the extent from minimum (0Hz, 0%) to maximum (50Hz, 100%) speed.

In the case of a unit fitted with both inlet and exhaust fans, the visualised information can be common for both the fans or they can be displayed for each fan separately, according to the settings in the configuration.

The following parameters are only accessible after the entering the password:

o **Comfort** (%) – The speed of the fan for inlet or exhaust in the **Comfort** mode, if the control of the quantity of air by a controller is selected, parameter **Air quantity = "Controller".** If the parameter **Air quantity** = "POL822", the control of speed is selected from the room instrument (in a remote manner) and the **Comfort** value is the maximum speed value which can be selected from the room instrument.

o **Economy** (%) – The speed of the fan for inlet or exhaust in the **Economy** mode, if the control of the quantity of air by a controller is selected, parameter **Air quantity = "Controller".** If the parameter **Air quantity** = "POL822", the control of speed is selected from the room instrument (in a remote manner) and the **Economy** value is the minimum speed value which can be selected from the room instrument.

o **Air quantity (Controller/POL822/QBM/CPG)** – It determines in what way the fan speed will be controlled. It is possible to select the control by a controller, from a room instrument, from the analogous pressure sensor (QBM) from Siemens or from the CPG flow rate controller from Ziehl-Abegg. After a change in this parameter it is necessary to store the parameters in the **Parameters** item or to carry out a restart of the controller.

Protection (%, %) – Speed of inlet and outlet fans, which are used at a low temperature of heating water or melting of the condensation units.

o **Start (%)** – Start speed of unit fans, which are used at low temperature of supplied air or water taken away.

o ***LowSplyTemp*** (°C) – If the difference of supplied and requested temperatures exceeds this value, the speed of the fans will be set to ***Start.***

o ***Low ventilation temperature*** (°C) – It is the temperature of supplied air at which the fans will be turned off in order to avoid any under-cooling of the area. The ***Release*** temperature will not reach 15 in this state. The function will be neutralized by entering an extremely low value.

o ***High ventilation temperature*** (°C) – It is the temperature of supplied air at which the fans will be turned off in order to avoid any overheating of the area. The ***Release*** temperature will not reach 15 in this state. The function will be neutralized by entering an extremely high value.

o ***BurnerFault*** (°C) – It is the temperature of supplied air at which the fans will be turned off in order to avoid any under-cooling of the area, if there was a failure of the gas burner. In general, this function is used in the cases when it is often possible to register a low gas pressure in the gas pipeline. The ***Release*** temperature will not reach 15 in this state. The function will be neutralized by entering an extremely high value.

o ***HighFlueGas*** (°C) – If the flue gas temperature exceeds this value, the fans will be activated even in case that the unit is Off. The ***Release*** will exceed 15 in this state.

o ***VentCool*** (No/Yes) – It permits operation of fans, if there was a request for cooling.

o ***VentHeat*** (No/Yes) – It permits operation of fans, if there was a request for heating.

o ***DelayInlet*** (s) – Delay of activation of the inlet fan if there was a request for switching on the fans.

o ***DelayExhaust*** (s) – Delay of activation of the exhaust fan after activation of the inlet fan. This function is only important in case that the exhaust fan is switched on by a separate output of the controller.

o ***Rundown*** (s) – It determines the time for which the fans will run after the switching off of the unit. It is important in particular for additional cooling of the air conditioning unit.

o ***Parameters Save*** – It saves parameters into the backup memory of the controller and at the same time it makes the restarting of the controller and thus it initialises the changes carried out.

3.7.2.2 Filters

The item contains information on the state and operation of all the filters monitored. In the case of a unit fitted with several filters, each filter should be monitored separately (Fig. 11):

o The actual state of filter clogging is indicated for each filter (***Good/Bad***). Clogging is monitored by a manostat. The setting of the manostat is prescribed in the technical report to each air conditioning unit. In the case of a bad state of the filter it is recommended to exchange the filter, otherwise the filter could break.

Filters	1/6
Inlet filter	Good
Bad hours	0
Bad starts	0
Outlet filter	Good
Bad hours	0
Bad starts	0

Fig. 11

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o *Bad hours* – They inform about the operation with a clogged filter. The operation with a bad filter reduces quantity of supplied air; it worsens operation conditions of the fan and can lead to overheating of the unit.

o *Bad starts* – It serves as an information value about the number of starts of the unit with clogged filters.

3.7.2.3 Flap valves

If the air conditioning unit is fitted with flap valves with adjustable drives, then it is possible to view information on these flap valves here. Otherwise the information on flap valves is not displayed because flap valves open and close together with the start of fans. The flap valves can be controlled on the basis of unit operation, external contact or mixing request.

Flap valves	1/3
Inlet flap	0%
Outlet flap	0%
Mixing flap	0%

Fig. 12

As a standard, mixing can be carried out on the basis of current operating mode (Comfort, Economy), temperature (outdoor, supplied, room, after recuperator), weekly time schedule, user request from POL822 controller or according to the required temperature as a part of heating or cooling sequence. The mixing can be affected by higher-priority functions, as for example humidity and air quality sensors or failure protection functions. If a water heater related failure occurs (anti-freeze thermostat, low temperature of removed water in the return circuit, low temperature of air supplied) the mixing flap valve opens at 100% and the inlet and outlet flap valves close. The flap valves of the inlet and outlet are usually controlled by the same signal as the mixing flap; they only feature an opposite rotation direction. To visualise the state of the flap valves and fresh air quantity correctly, it is necessary to maintain correct configuration of the flap valves of the air conditioning unit according to the wiring chart. Basic information on flap valves (Fig. 12) is accessible without entering a password as follows:

o *Fresh air (%)* – Quantity of fresh air supplied to the area.

o *Flap valve (%)* – Requirement for the position of the flap valves. The value is shown separately for each flap valve permitted in the configuration. This value should correspond to the actual flap valve position, if its control output is correctly set according to the wiring chart.

The following parameters are only accessible after the entering of the password:

o *Control (Standard/Mix/Contact, 0-10V/2-10V)* – These parameters can be set for each flap valve, which is controlled by an independent controller output. If all flap valves are controlled by one signal together with the mixing flap valve, then this option has no effect. The first parameter determines whether the flap valve should be controlled on the basis of the unit operation, together with the mixing flap valve or on the basis of the contact connected to the specified digital input. The second parameter determines the range of the output control signal for the servo drive of the flap valve. This value is entered according to the type of the servo drive used. Only a parameter is set for a mixing flap valve. Only the output control signal range parameter can be set for the mixing valve.

- *MixingComfort (Fixed/Temperature/Calendar/POL822/Required)* – Provided that the unit contains a mixing flap valve, it is possible to set, in this parameter, mixing to a fixed value, according to the temperature, time program, POL822 controller or required temperature as a part of heating or cooling sequence, if *Comfort* mode is active.

- *MixingEconomy (Fixed/Temperature/Calendar/POL822/Required)* – Provided that the unit contains a mixing flap valve, it is possible to set, in this parameter, mixing to a fixed value, according to the temperature, time program, POL822 controller or required temperature as a part of heating or cooling sequence, if *Economy* mode is active.

- *FixedComfort (%)* – A fixed position of mixing for selection *MixingComfort="Fixed"*

- *FixedEconomy (%)* – A fixed position of mixing for selection *MixingEconomy="Fixed"*

- *MixingTemperature (Outdoor/Room/Supplied/Recuperator)* – It determines the temperature sensor according to which the mixing is to be controlled for the option *MixingComfort="Temperature"* or *MixingEconomy="Temperature".*

- *MixingMin, MixingMax (°C)* – Limit temperature values for linear control of mixing for the option *MixingComfort="Temperature"* or *MixingEconomy="Temperature"*. The first value determines at what temperature the fresh air quantity will be 0%. The second one determines at what temperature the fresh air quantity will be 100%. The fresh air quantity between these limit temperatures will change in a linear way.

- *Monday, Tuesday, ……, Sunday* – setting of the mixing time program. Each day contains 6 time points, where the time and mixing position are set. The time program is functional only if *MixingComfort="Calendar"* or *MixingEconomy="Calendar"* is set.

- *MinFreshAir (%)* - Min. value of opening of supply air flap valve. This parameter has not effect, if the unit is *Off*. When the unit is On and mixing mode is set or the flap valves are controlled by a common signal, inlet and outlet flap valves are always open – at least in accordance with this minimum value.

- *State (Off/Heat/Cool)* - information about the state of the unit

- *Mode (Protection, Economy, Comfort, Off)* - information about the state of the unit

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3.7.2.4 Recuperator

Recuperator (Fig. 13) may serve, except for heat recuperation also for cooling energy recuperation. The recuperator can be of a plate type or rotary. The recuperator protection from freezing can be ensured through a sensor installed downstream of the recuperator on the air outlet. As a sensor it is possible to use a manostat, channel temperature sensor, or both. If the sensors signal freezing of the recuperator, the bypass flap valve at the

Recuperator		1/5
State	0%	Off
Operation hours		0
Number of starts		0
Release - Heating		3
Release - Cooling		3

Fig. 13

plate recuperator will open or the speed of the rotary recuperator will drop. Also the mixing flap valve will fully open, if the unit contains any. The protection of the rotary recuperator drive is ensured by a thermal contact of drive connected to a frequency converter, if the drive has it. If the drive doesn't have a thermal contact, it is necessary to connect the relevant terminals on the frequency converter, or change the frequency converter parameters. The setting of frequency converters for the individual order is included in the documentation. Basic information about the recuperator accessible without entering a password are indicated in Fig. 13.

The following parameters are only accessible after the entering the password:

o **Cool** (No/Yes) – It determines whether the recuperator is to take part in cooling.

o **Heat** (No/Yes) – It determines whether the recuperator is to take part in heating.

o **Anti-freeze** (°C) – Anti-freeze protection temperature, signalling the freezing of the recuperator. This value is important only in case that the anti-freeze protection uses a channel temperature sensor installed downstream of the recuperator on the air outlet.

3.7.2.5 Gas heating Menu33

The gas heating burner (Fig. 14) is controlled on the basis of the selected mode and the required temperature in cooperation with temperature sensors and a bypass flap valve of the burner, if installed. Burner systems Monzun by Mandík a.s. or third-party burner systems can be installed. The burners may be of a one-level type, two-level type or modulation burners. The maximum value of the 100% modulation burner corresponds to a maximum capacity of the

Burner		1/5
State	0%	Off
Operation hours		0
Number of starts		0
Number of failures		0
Release		0

Fig. 14

exchanger in kW according to the documentation. The minimum value of the actual capacity (0%) is set during the commissioning of the burner and corresponds to the minimum capacity which is set during the commissioning of the burner. During the normal operation, the burner will turn on only in case that the fans are activated. The operation of the burner is signalled with a LED on the control box. In transitional periods

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(spring and autumn), the number of starts can be higher than in the winter period. Too frequent starts of the burner can, however, signal an incorrect function of the entire air conditioning unit.

The bypass flap valve of the gas exchanger is controlled on the basis of the flue gas temperature so that it can be possible to achieve, during the normal operation, the required flue gas temperature during which optimum combustion takes place. Another function of the bypass flap valve is to ensure minimum condensation of water vapours in the exchanger during a cold start.

Protective functions are ensured by the emergency thermostat and the temperature sensor in the flue gas. The flue gas temperature sensor operates as an operation thermostat set to 200°C. On achievement of this temperature in flue gas the burner will turn off during the running fans. After cooling to below 80°C, the burner will switch on again, unless another failure occurred there. It also checks the temperature in flue gas, even when the unit is off and if it exceeds 80°C, it will activate the fans, in order to ensure cooling. The emergency thermostat is placed downstream of the gas exchanger and is set in a fixed manner to 90°C. If this temperature is exceeded, the emergency thermostat will turn the power supply of the burner off, and an intervention (thermostat reset), is expected from operators who should deal with the cause of this situation. If the control system is shut-off during the operation of the gas burner, overheating will occur.

The convector ensures suitable thermal conditions for the lighting of the burner and protects it from freezing. If outdoor temperature sensor is not installed, the flue gas temperature sensor installed outdoors at the base of the stack is used for the protection. The system is implemented by a 230 V socket located in the room with the burner electronics, which is controlled by the controller. An electric heater or heating cable can be connected to the socket. If the power supply of the control box or of the controller is switched off, this protection will not be functional! It is used exclusively in case of external designs of air conditioning units.

The following parameters are only accessible after entering the password:

o *OnEnable (°C)* – If the difference between the required and current temperatures has exceeded the preset value, then the activation of the burner will be permitted.

o *OffEnable (°C)* – If the difference between the current and required temperatures has exceeded the preset value, then the switching off of the burner will be permitted.

o *IntegralOn* – Integration value after achievement of which the starting of the burner is permitted. Integration will be activated with achievement of the required *Release* value and at the same time if the difference between the required and current temperatures has exceeded the *OnEnable* value*.* In case of *IntegralOn=0* the burner start is permitted immediately.

o *IntegralOff* – Integration value after achievement of which the switching off of the burner is permitted. Integration will be activated if *Release* has dropped below the required value and at the same time the difference between the current and required temperatures has exceeded the *OffEnable*

value. In case of ***IntegralOff=0*** the switching off of the burner is permitted immediately.

o ***MaxFlueGas (°C)*** – The emergency limit of the flue gas temperature. On its achievement the burner will be turned off and a failure is signalled.

o ***MaxSupplied (°C)*** – The limit value of the supplied air temperature. On its achievement the burner will be turned off.

Basic information on the gas exchanger bypass flap valve accessible without entering a password is:

o ***State (%)*** – current value of the opening of the exchanger flap valve.

The following parameters are only accessible after entering the password:

o ***Control (Normal/Invert, 0-10/2-10)*** – polarity and type of the control signal must conform to control signal range defined in the servodrive technical parameters. The flap valve must be open if the burner is off.

o ***MaxFlueGas (°C)*** – If the flue gas temperature is higher, then the exchanger bypass flap valve is closed so that the exchanger can get cooled.

o ***MinFlueGas (°C)*** – If the burner is Off and the flue gas temperature is higher, then the exchanger bypass flap valve is closed so that the exchanger can get cooled.

o ***FlueGasRequired (°C)*** – The required temperature of flue gas, according to which the flap valve position is controlled. The control process starts after the flue gas temperature reaches a temperature 40 °C lower than the required values, so that the exchanger can be heated promptly.

Further basic information on the gas exchanger convector accessible without entering a password are:

o ***State (Off/On)*** – information on the state of moderate heating of the burner housing.

The following parameters are only accessible after entering the password:

o ***TurnOn (°C)*** – Limit temperature for activation of moderate heating of the burner housing by the convector. The moderate heating of the burner housing will always turn on when the outdoor or flue gas sensor temperature drops below the limit value for the time given by the delay. If a heating device with an inbuilt thermostat is used, it is recommended to set the limit temperature to a value higher than 10°C and to set the temperature required in the burner box on the thermostat, if possible.

o ***DlyConvect (min)*** – Parameter indicating the delay of the convector activation and deactivation, if the outdoor or flue gas sensor temperature exceeds limit value.

3.7.2.6 Water heating Menu33

Water heating (Fig. 15) is controlled on the basis of the selected mode and the required temperature in cooperation with temperature sensors. It uses qualitative control, which involves a three-way valve and electrical pump.

Water heating		1/5
State	0%	Off
Operation hours		0
Number of starts		0
Number of failures		0
Release		7

Fig. 15

The emergency anti-freeze protection is ensured by an anti-freeze thermostat, temperature sensor of outlet water installed on the return pipe sensor and sensor of the supplied air temperature. If the emergency anti-freeze protection is activated, the fans are switched off, mixing flap valve opens at 100%, pump starts, three-way valve opens at 100%, mixing flap valves open and a failure is signalized. The emergency anti-freeze protection is activated if:

- The anti-freeze thermostat signalizes temperature drop under value set, preferably by means of open contact.
- The temperature of water or air supplied drops below 6 °C.

Operating anti-freeze protection is carried out on the basis of the temperature of water in the return pipe, outdoor temperature and supplied air temperature. The operational anti-freeze protection is signalized on the controller display as an auxiliary TPM mode (Thermal Protection Mode) in the following cases:

- Protection with the unit off (the fans don't run) – if the temperature of the outlet water drops below 12°C, the pump switches on and the three-way valve begins to open. The valve will be fully opened at 6°C. Between 6°C and 12°C the valve position is linearly dependant on the outlet water temperature.
- Preheat – Prevents the fans from turning On for 120s, if the outdoor temperature is lower than 5°C. At the same time, the pump is switched On and the three-way valve opens. The three-way valve fully opens at -10°C. Between -10°C and 5°C the valve position is linearly dependant on the outdoor temperature. The preheat lasts 120 s and cannot be repeated until the next start of the unit, whereas there must be at least 5 minute delay between the individual starts.
- Thermal start (fan start speed) – During the start of the unit the fan speed is reduced to **Start** (Fans) in case the outdoor temperature drops below the **LowOutdoorTemperature** and, at the same time, the outlet water temperature is lower than **StartWaterTemperature** for min. 20 s. At the same time, the mixing flap valve opens to maximum, the pump turns On and the three-way valve opens. The thermal start will occur also when the supplied temperature is lower than **MinCascTemp** (Cascade Regulation) during the start of the unit.

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Protection during the operation of the unit (water heating is On) – If the temperature of the outlet water in the return pipe drops below *LowWaterTemperature*, the fan speed is reduced to *Protection* (Fans), the pump remains On and the mixing valve opens to maximum. This state lasts, until the outlet water temperature reaches *RequiredWaterTemperature* for at least 2 min.

The following parameters are only accessible after entering the password:

o *LowWaterTemperature (°C)* – Limit value of outlet water is used for operational protection of water heating. The factory set value is 12°C.

o *RequiredWaterTemperature (°C)* – Limit value of outlet temperature ensuring that the water heating function corresponds to parameters of the air-conditioning unit. The factory set value is 40 °C. However sometimes it is necessary to lower the value to account for the output of the boiler room supplying the heating water.

o *LowOutdoorTemperature (°C)* – Limit value of outdoor temperature during the start of the unit. The factory set value is 10°C.

o *StartWaterTemperature (°C)* – Limit value of outlet water during the start of the unit. The factory set value is 40°C.

o *Output* (*0-10V/2-10V*) – The parameter determining the range of the output control signal for the servo-drive of the three-way valve.

3.7.2.7 Electrical heating Menu33

Electrical heating (Fig. 16) is controlled on the basis of the selected mode and required temperature in cooperation with temperature sensors. The system uses electrical heaters of a one-level type, multilevel type, modulation or combined types. A precondition for electrical heater activation is that the fans are switched on.

Electrical heating		1/5
State	0%	Off
Operation hours		0
Number of starts		0
Number of failures		0
Release		7

Fig. 16

Protective functions are ensured through an emergency thermostat which interrupts, on overheating, the power supply of the electrical heating and this state is signalled in the controller which switches the control signal of the electrical heating power output off and arranges for general cooling. If power supply is turned off during the operation of electrical heating, overheating will occur!

The following parameters are only accessible after entering the password:

o *ContactorOn (No/Yes)* – It is only relevant for modulated electrical heaters and permits activation of the contactor for all the time of heating, even though the modulation signal is zero. The sense is to reduce the wear and tear of contactors.

o *Section On/Off* (s) – It is only relevant for multistage non-modulated electrical heaters and determines the time after which the next stage will be connected/disconnected.

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3.7.2.8 Cooling

On the market it is possible to find a large number of manufacturers of external cooling equipment, which can be used with air conditioning units. Almost every manufacturer of cooling or condensation units has its own method of control. It causes a large dispersion in the method of control of cooling or condensation units and sometimes it is very difficult to synchronise the control of air conditioning and condensation units.

Cooling		1/5
State	0%	Off
Operation hours		0
Number of starts		0
Number of failures		0
Release		7

Fig. 17

Therefore it is possible to select the type of condensation unit (cooler) control according to the specific control procedures of individual manufacturers, which are continuously updated. A dedicated PID controller is used for each condensation unit mode (cooling, heating). Basic information about cooling accessible without entering the password are:

o **Enable (Off/On)** – Information about whether the condensation unit can be turned On with respect to compressor protection (too fast start etc.).

o **Defrosting (Off/On)** – Signalization of a temporary state of the condensation unit, in which it cannot carry out heating.

o **Mode (Cooling/Heating)** – Request for the condensation unit mode.

The following parameters are accessible after the entering of the password:

o **PermanentOn (Yes/No)** – It specifies activation of the external condensation unit. On the **Unit** selection, the external unit will be activated together with the air conditioning unit. On the **C/H** selection, activation will only take place during the arising of the request for cooling or heating.

o **DelayOff (min)** – Delay for turning Off the condensation unit after a request for zero output.

o **HeatMode (No/Yes)** – Determines, whether the condensation unit will be used also if heating is On. If **No** is selected, the condensation unit will not be used for heating.

o **ControlType** – Type of control of condensation unit (cooler) according to the manufacturer. Some types may be suitable also for condensation units of other manufacturers than those indicated. At the present, the following options are available:

▪ **Cooler** – Cooling is not carried out by the condensation unit (separate cooling system).

▪ **UTI-INV** – Cooling is carried out by Fujitsu condensation unit with UTI-INV control module.

▪ **ANL2WIRE** - Cooling is carried out by Fujitsu condensation unit with ANLWIRE control module.

▪ **KM113.03** - Cooling is carried out by LG condensation unit with KM113.03 control module.

▪ **FDP3** - Cooling is carried out by Toshiba condensation unit with FDP3 control module.

▪ **EKEQFCB** - Cooling is carried out by Daikin condensation unit with EKEQFCB control

module.

- ▪ *PAC-IF012* - Cooling is carried out by Mitsubishi condensation unit with PAC-IF012 control module.

o *Minimum (°C)* – Minimum outdoor air temperature at which cooling can be required.

o *Delay (s)* – Start delay of condensation unit filters out temporary states.

o *Output (0-10V/2-10V*) – Used especially for water cooling systems. The parameter determines the valve servodrive control signal range. The parameter must correspond to the control signal range indicated in the technical specification of the servodrive.

o *CoolingOn (V*) – Used for condensation units with states controlled by DC constant voltage signal 0-10V. Voltage at which the condensation unit cooling mode will start shall be set according to technical specification.

o *HeatingOn (V*) – Used for condensation units with states controlled by DC constant voltage signal 0-10V. Voltage at which the condensation unit heating mode will start shall be set according to technical specification.

3.7.2.9 Cascade regulation

The item "cascade regulation" (Fig. 18) enables a higher-quality control of the required temperature in case that the temperature required is related to the room temperature or to the outlet temperature. Basic information accessible without entering a password is:

Cascade regulation	1/3
State	Heating
Required temp.	5°C
Temperature	Room

Fig. 18

o *State (Off, Heating, Cooling)* – Current state of the cascade regulation calculated according to the required temperature, *ClimaDeadBand* (Temperature) value, *ClimaTemperature* (Temperature) value, supplied temperature, *MaxTemperature* value and *MinTemperature* value.

o *RequiredSupply (°C)* – Calculated required temperature of supplied air, which is submitted to other controllers aiming to reach the *RequiredTemperature* value determined by the required air conditioning unit mode. (start screen).

The following parameters are only accessible after entering the password:

o *MaxTemperature (°C)* – Maximum possible required temperature of supplied air which is calculated by the cascade regulator.

o *MinTemperature (°C)* – Minimum possible required temperature of supplied air which is calculated by the cascade regulator.

o *HeatingSequence (No/Yes)* – If the air conditioning unit is equipped with more heat sources, the parameter determines the contribution of the individual sources to the total output of the unit. If *No*

is selected, all heat sources turn On simultaneously. If *Yes* is selected, they are turned On in sequence.

o *CoolingSequence (No/Yes)* – If the air conditioning unit is equipped with more cooling sources, the parameter determines the contribution of the individual sources to the total output of the unit. If *No* is selected, all cooling sources turn On simultaneously. If *Yes* is selected, they are turned On in sequence.

3.7.2.10 Air quality

The item "air quality" (Fig. 19) specifies the function of the fans and mixing (circulation) flap valves, if they are installed, in the case of activation of the air quality sensor. Basic information accessible without entering a password is:

Air quality		1/3
State	Good	0%
Bad hours		0
No. of activations		0
Fig. 19		

o *State (Good/Bad, % or ppm)* – current state of air quality with regard to the selected limit value and the current value measured by the sensor.

o *Bad hours* – Information on the time of the operation for which the air quality was assessed by the sensor as bad.

o *No. of activations* – It serves as an information value on the number of evaluations of poor air quality.

The following parameters are only accessible after entering the password:

o *Control (Fixed/Sensor)* – At the *Fixed* selection, if the air quality is bad, the fans will be set to fixed speed stated for individual fans and the mixing is set to the value stated for the mixing flap valve. At the *Sensor* selection, if the air quality is bad, the fans and flap valves will be controlled directly by the signal delivered by the air quality sensor.

o *Switch on (% or ppm)* – Limit value of the air quality, on the exceeding of which a bad state is signalled and the speed of fans, together with the mixing flap valves are set to the requested value for a bad state of air quality according to the selection of the control method (*Control*). Standard values of the speed of fans (*Comfort, Economy*) and of the opening of flap valves should be lower than these values.

o *Switch off (% or ppm)* – Limit value of the air quality at which the signalling of bad air quality is terminated. Speed of fans and mixing will return to the original values.

o *Inlet fan (No/Yes, %)* – Selection of permission of the inlet fan speed control according to the air quality and fan speed in case that the state of air quality is bad. Standard values of speed of fans for modes (*Comfort, Economy*) should be smaller than these values.

o *Exhaust fan (No/Yes, %)* – Selection of permission of the exhaust fan speed control according to

the air quality and fan speed in case that the state of air quality is bad. Standard values of speed of fans for modes (**Comfort, Economy**) should be smaller than these values.

o **MixingFlapValves (No/Yes, %)** – Selection of permission of the control of mixing according to air quality and level of mixing in case that the state of air quality is bad. Standard values of mixing for the modes (**Comfort, Economy**) should be smaller than this value.

o **Validity (Mode/Always)** – The **Mode** selection will ensure that the system will respond to the bad quality of air only in case that the unit is in operation. The **Always** selection will ensure that the system will respond to bad quality of air in case that the unit is switched off.

3.7.2.11 Humidity

The item "humidity" (Fig. 20) specifies the function of the fans and of the mixing (circulation) flap valve, if they are installed, in the case of the humidity sensor activation. Basic information accessible without entering a password is:

Humidity		1/3
State	Good	0%
Bad hours		0
No. of activations		0

Fig. 20

o **State (Good/Bad, %)** – Current state of humidity with regard to the selected limit value and the current value measured by the sensor.

o **BadHours** – Information on the time of operation for which air humidity was assessed by the sensor as high.

o **NoOfActivations** – It serves as an information value about the number of evaluations of unsatisfactory air humidity.

The following parameters are only accessible after entering the password:

o **Control (Fixed/Sensor)** – On the **Fixed** selection, in case of high air humidity, fixed speed is set on the fans, as stated for individual fans, and mixing is set to the value stated at the mixing flap valve. On the **Sensor** selection, in case of high air humidity, the fans and flap valves will be controlled directly by the signal delivered by the humidity sensor.

o **Switch on (%)** – Limit value of humidity on the exceeding of which a bad state is signalled and the speed of fans and mixing flap valves are set to the value required for high air humidity according to the selection of the control method (**Control**). Standard values of the speed of fans (**Comfort, Economy**) and opening of the flap valves should be lower than these values.

o **Switch off (% or ppm)** – Limit value of air humidity, at which the signalling of high air humidity is terminated. Speed of fans and mixing will return to the original values.

o **InletFan (No/Yes, %)** – Selection of permission of the inlet fan speed control according to the air humidity and fan speed in case that air humidity is high. Standard values of speed of fans for modes (**Comfort, Economy**) should be smaller than these values.

o *ExhaustFan (No/Yes, %)* – Selection of permission of the exhaust fan speed control according to the air humidity and fan speed in case that air humidity is high. Standard values of speed of fans for modes (*Comfort, Economy*) should be smaller than these values.

o *MixingFlapValves (No/Yes, %)* – Selection of permission of the control of mixing according to air humidity and level of mixing in case that air humidity is high. Standard values of mixing for the modes (*Comfort, Economy*) should be smaller than this value.

o *Validity (Mode/Always)* – The *Mode* selection will ensure that the system will respond to high air humidity only in case that the unit is in operation. The *Always* selection will ensure that the system will respond to high air humidity in case that the unit is switched off.

3.7.2.12 Fire alarm

The item "fire alarm" (Fig. 21) makes it possible to put the air conditioning unit out of operation in the case of a fire alarm, signalling of smoke in the duct or a signal coming from the electrical fire alarm system ("EPS"). Basic information accessible without entering a password is:

Fire alarm	1/3
State	Good
Bad hours	0
No. of activations	0

Fig. 21

o *State (Good/Fire)* – Information on the state of EPS, fire detector or smoke sensor installed in the duct or in the area.

o *BadHours* – Information about the time for which the air conditioning unit was out of operation due to the active fire signal.

o *NoOfActivations* – Serving as an information value about the number of fire evaluations.

The following parameter is only accessible after the entering of the password:

o *HardFailure (No/Yes)* – If the hard failure is set to *Yes*, then it is necessary to reset, after the end of the fire alarm, alarm messages for the restarting of air conditioning units. If *No* is selected, the unit will return automatically to its original mode after the end of the fire alarm.

3.7.2.13 Boiler room

The item "boiler room" (Fig. 22) contributes to a higher quality of the water heating function. It makes it possible to preheat hot water to the necessary value and thus to save the costs associated therewith. Basic information accessible without entering a password is:

Boiler room	1/3
State	Off
Operation hours	0
Number of starts	0

Fig. 22

o *State (Off/On)* – Current state of the requirement for the boiler room activation.

The following parameters are only accessible after entering the password:

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- *HeatingWater (Yes/No)* – If *Yes* is selected, then in case of a low temperature of heating water the request for switching on the boiler room is activated. The value of the signalling of the low temperature of heating water is set in the *Water heating* item.

- *OutdoorTemperature (°C, Yes/No)* – Limit value of the outdoor air temperature at which the request for switching on the boiler room is activated in case that the *Yes* selection is entered.

- *Difference (°C, Yes/No)* – The value of the difference between the requested and outdoor temperatures at which the request for switching on the boiler room is activated if the *Yes* selection is entered.

- *CondensationUnit (%)* – Value of condensation unit output at which the request for boiler room start is activated.

- *Delay (min)* – Delay of the arising of the request for switching on the boiler room, which can filter short-term requirements or take local conditions into consideration.

3.7.2.14 External switchboard clima

The item "external switchboard clima" (Fig. 23) enables moderate heating and ventilation of the switchboard with a controller on the basis of the outdoor temperature or internal temperature of the controller, and thus also elimination of the ambient impacts on components installed in the switchboard. Basic information accessible without entering a password is:

Ext. Switchboard Clima	1/3
Heating	Off
Operation hours	0
Number of starts	0

Fig. 23

- *Heating, Ventilation (Off/On)* – Current state of the request for activation of moderate heating or ventilation of the switchboard.

The following parameters are only accessible after entering the password:

- *LowTemperature (°C)* – The temperature at which the moderate heating of the switchboard is activated. Moderate heating will be switched off 5 minutes after the end of the requirements.

- *HighTemperature (°C)* – The temperature on the exceeding of which the ventilation of the switchboard is activated. Ventilation is switched off 5 minutes after the end of the request.

- *Temperature (Internal/External)* – It determines the temperature according to which a decision is made about the moderate heating or ventilation of the switchboard. *Internal* temperature means the inner temperature sensor of the controller and *External* means the outdoor temperature sensor.

- *Delay (min)* – delay of the end of the request for activation of moderate heating or ventilation of the switchboard.

3.7.2.15 Room instrument

One air conditioning unit can be controlled from two room instruments simultaneously. Every room instrument has separate setting in the controller:

o ***Communication (OK/Failure)*** – It informs about a failure of communication between the controller and the room instrument. The parameter is accessible without entering a password.

The following parameters are only accessible after entering the password:

o *Address* – This is used for the entering of communication parameters which correspond to the parameters 005, 006 and 007 in the room instrument. Separate setting for each instrument.

o ***Language (Czech/German/English)*** – It serves for selection of the language for abbreviation of the names of information values or abbreviations of the setting of comfort and economy temperatures.

o ***OffFunction (Switch off/Protection)*** – It determines the mode which is set after the switching off of the air conditioning unit from the room instrument.

3.7.3 Configuration

The item "configuration" (Fig. 24) defines the components of the air conditioning unit which are to be controlled by the regulation. Basic configuration is made in the factory or on additional changes of components and it should be made by an authorised staff member. Thus it is possible to determine the function of the equipment and then also the regulation method. If the setting is improper, there is a danger of damage to the equipment or of a breach of the work safety rules. Configuration is only accessible after the entering of the password. The selection *(Yes/No)* determines, for most items, whether the item is contained in the unit and whether its function is to be monitored. Non-standard selections of the items are described separately.

Configuration	1/18
Gas heating	1
Burner type	Mod
Water heating	Yes
Cooler	Divided
Exchanger flap	Yes
Mixing flap	Yes
Ambient temperature	Yes
Inlet temperature	Yes
Flue gas temperature	Yes
Outdoor temperature	Yes
Inlet fan	Yes
Inlet filter	Yes
Exhaust fan	No
Outlet filter	No
Servicing indicator	Yes

Fig. 24

o *GasHeating (No/1/2)* – Selection of the number of gas exchangers installed.

o *BurnerType (Mod/1-lev/2-lev)* – It determines the method of gas heating control. A modulation, one-level or two-level gas burner can be selected.

o *ElectricHeating (No/1/2/3/4/5)* – Electrical heating can have up to five levels for which it is possible to monitor the overheating of the exchanger signalled by the emergency thermostat.

o *CondensationUnit-Cooler (No/Yes/Divided)* – Selection *Yes* includes all types of cooling. On the special selection *Divided* it is two-level cooling with specific control. On the request for cooling the first level is activated. If the first level is not sufficient then the second level is activated and the first level is switched off.

o *ExchangerFlapValve (No/Yes)* – Selection *Yes* means that the gas burner chamber is provided with a bypass flap valve.

o *Inlet flap, Outlet flap (No/Yes)* – Selection *Yes* means that the unit is fitted with an inlet flap valve or outlet flap valve which are not to be coupled with the mixing flap valve and are to be controlled with a separate signal.

o *MixingFlapValve (No/Yes)* – Selection *Yes* means that the unit is fitted with a mixing flap valve. The inlet flap valve and exhaust flap valve can be coupled with a mixing flap valve, and then it is not necessary to configure them separately.

o *RoomTemperature (No/1/2/3/4)* – It is possible to use up to four temperature sensors for measurement of the room (ambient) temperature.

o *ExhaustFan (No/Yes/Common)* – The *Common* selection indicates that the unit contains an exhaust fan which has common information with the inlet fan about the operation or a failure. The switching

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on and control of speed of the exhaust fan can be separate or common with the inlet fan. This depends on the particular air conditioning unit and is clear from the wiring chart of the MaR unit.

o *ExhaustFilter (No/Yes/Common)* – The *Common* selection indicates that the unit contains an exhaust filter which has common information with the inlet filter, which is clear from the wiring chart of the MaR unit.

o *SaveParameters (_____/Save)* – The *Save* selection saves parameters in the backup memory of the controller. At the same time it will restart the controller and thus it will initialise the changes performed.

o *LoadParameters (_____/Load)* – The *Load* selection loads parameters from the backup user memory of the controller. At the same time, the controller restarts and initiates the changes.

o *FactorySettings (_____/Upload)* – The *Upload* selection serves for introduction of the original (default) configuration which was set in the factory. At the same time it will restart the controller and thus it will initialise the changes performed.

3.7.4 Device testing

To access the device test item (Fig. 25), the user is required to enter the password. The function is used by service technicians during commissioning and servicing of the equipment. The testing function enables separate control of individual components of the air conditioning unit. Testing can be enabled by setting *EnableTesting=Yes* and it is signalized as an auxiliary *Test* mode on the controller display.

It allows the switching on and off of a fan, to set an opening angle of flap valves in percentage, to switch on and off of the burner and to regulate its capacity in percentage, etc.. During the device testing, the protective functions may not be functional, and for this reason improper handling could lead to the equipment damage or to a breach of the work safety rules. After the end of the testing please set *EnableTesting=No*! Otherwise the standard control will not be available!

3.7.5 Inputs and outputs

Here it is possible to view current values on physical inputs and outputs of the controller, including their functional state. If there is a suspicion for failure, here it is possible to check, whether the connected sensors are operational and display correct values. Fig. 26 indicates all types of inputs and outputs. Each line contains an input type identified by an ordinal number, which corresponds to the physical description of connectors on the controller. The information include value, information about status, as well as the function and type of sensor for universal inputs, which is a part of the factory settings. The inputs and outputs are identified in the following way: *xVVy*, where x is ordinal number of I/O extension of the controller and can have the following values:

- No number – inputs and outputs of an independent POL638 controller.
- 1 - Inputs and outputs of POL945 extension.
- 2 - Inputs and outputs of POL955 extension.

VV determines the type of input/output according to the following syntax:

- *X* – Universal input to which an input function may be assigned. Various types of resistance, voltage, current and digital sensors can be connected to this input. The input can be configured as voltage, current or digital as needed.
- *D* - Potential-free digital input.
- *Y* - Analogue input with range 0-10V.
- *Q* - Relay output 230VAC, max. 3A/ 2A (cos 0.6).

    And *y* is ordinal number of the controller or extension input/output.

3.7.6 I/O Assignment

Here it is possible to assign controller inputs and outputs to temperature sensors, fans, filters, electrical heating, etc. according to wiring diagrams. Setting is already carried out in the factory. Changes can be made only by persons with sufficient knowledge in the field, because incorrect settings may cause damage to the equipment or operator injury.

The assignment of digital inputs shall be carried out for each component separately (Fig. 27) after a component is selected according to the following examples:

- ➢ *Assignment of input to a temperature sensor* – In the *Temperature* menu, select the required temperature sensor with suffix *.Sel* and select one of the universal inputs identified according to the syntax described in the chapter Inputs and Outputs. Apart from these inputs, it is possible to assign the sensor to a Room instrument identified by U1 or U2. Another option is to assign a constant temperature by using the item *Set.* After selecting the item, the required value will be set for the selected temperature sensor with suffix *.Set.*

- ➢ *Assignment of an input to a component* – After selecting the required component, the functions which can be connected are displayed with *.Sel,* for which one of the digital inputs identified according to the syntax described in the chapter Inputs and Outputs. Another option is to assign a constant value (*Off/On)* by using the *Set* option. After selecting the item, the required value will be set for the selected function with the *.Set* suffix. Digital inputs enable also to change the polarity. Analogue inputs can be set in the same way as temperature sensors.

- ➢ *Assignment of digital outputs* - Carried out in the *DigitOutputAssign* menu, where a digital request of the component connected is assigned to digital outputs identified by *.Sel* prefix.

Another option is to assign a constant value (***Off/On)*** using the ***Set*** option. After selecting the item, the required value will be set for the selected output with the ***.Set*** suffix. Digital outputs enable also to change polarity by setting the output with ***.Inv*** suffix to ***Yes***.

➢ ***Assignment of analogue outputs*** - Carried out in the ***AnalogueOutputAssign*** menu, where an analogue request of the component connected is assigned to analogue outputs identified by ***.Sel*** prefix. Another option is to assign a constant analogue value in % using the ***Set.*** option. After selecting the item, the required value will be set for the selected output with the ***.Set*** suffix.

3.7.7 System Parameters

The ***SystemParameters*** (Fig. 28) item enables to change the time, date, language, communication parameters, passwords, summer/winter time, etc. It also contains information about the application and software used. The ***Controller*** item displays the internal temperature of the controller.

In the text below, only those parameters that can be useful for the user will be described.

System Parameters 1/8
3.01.2015 14:05:24
Language selection ▶
Communication ▶
Password service ▶
Info on application ▶
Summer/winter time ▶

Fig. 28

3.7.7.1 Setting of the time

Current date and time are displayed on the first row below the line with the name of the menu. If this row is selected, then by pressing the OK button you will enter the specification of the day. By turning the OK button you will set the day required, which is to be confirmed by pressing OK. The cursor will go to the next data selection. The entering will end automatically after the entering of the number of seconds or it is possible to end it at any time by pressing the ESC key. The correct entering of the data and time is important for correct function of the unit according to the time program.

3.7.7.2 Language selection

Language selection is basically carried out only during the commissioning of the unit and it serves for the switchover of the displayed texts on HMI in the language required by the user. On a standard basis, the supported languages are English, German, Czech and Russian, but it is possible to add other languages too. The change will be made by double pressing of the OK button and by selection of the required language from the menu. Language selection is ended with the ESC key.

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3.7.7.3 Communication

The controller features, on a standard basis, implementation of communication protocols for communication with the help of: ProcessBus, TCP/IP, ModBus, LON, Modem and SMS. Their final configuration is carried out, if necessary, with the help of this menu during commissioning and it should be made by a servicing engineer. More detailed information is in the system documentation to the Climatix controller from Siemens.

3.7.7.4 Password service

The controller has 6 levels of user passwords, one servicing password and one factory password. The user level of the password is signalled with one key or number 2 to 7 in the upper left corner of the display. The servicing password is superior over the user password and is signalled by two keys or by the number 1. The factory password features the highest level and is signalled by three keys or by the number 0. The passwords serve for the locking of access to some menu items for unauthorised persons.

After pressing the OK button you will see a four-place array for the entering of the password and the cursor is on the first position. Select the first digit of the password by turning the OK button and confirm your selection by pressing the OK button. Continue this way until the entering of the last digit of the password. If the password is entered correctly, you will see, in the upper left corner, number of keys corresponding to the level of the password or the password level number. In the case of an in correct selection you will not see any key. The process of entering the password can be terminated at any time by pressing the ESC key. In the case of access to this item with the valid password, the user is offered a possibility of logging off or changing the existing password. The password validity automatically terminates by default after 10 minutes from the last depressing of an arbitrary key. This time can be changed in the HMI item.

Default factory settings of the passwords are as follows:

- Factory = "0000",
- Servicing = "1111"
- User = "2222", "3333", "4444" to "7777"

Furthermore it is possible to immediately terminate here the password validity or to change the four-digit values of passwords of all levels.

3.7.7.5 Summer/winter time

This item is important in the countries where changeovers to summer and winter time take place. It is possible to set there the exact date and time of the beginning and end of the summer time.

3.7.8 Enter the password

The default password from the factory for servicing access is: "0000". Its change can be made in the item *DeviceParameters⇨SystemParameters⇨PasswordSetting.*

3.7.9 Next servicing

The item *NextServicing* serves for the entering of the date with a yearly interval, after the exceeding of which the alarm message "Servicing" is displayed, reminding the operator of the necessity of assurance of a servicing inspection. This function makes sense in particular for the units with gas heating, when yearly servicing inspections of gas equipment are required. The function can be forbidden in the configuration item "Servicing".

4 Alarm messages

The alarm messages screen (Fig. 29) is by pressing the Alarm key identified by a bell or red LED. New alarm is indicated by ringing bell on the display or flashing LED on the key. The alarm can be confirmed in the menu *AlarmList* by setting the item *Confirm* to *Active*. After confirmation, which is password protected, the LED stops flashing only in case the alarm is not active anymore. Number of active alarm is indicated on the same line.

AlarmMessages	1/2
Alarm List	0
Alarm History	5

Fig. 29

After confirmation the alarms are moved from the list of alarms to the history of alarms. The list of alarms as well as the history of alarms may contain max. 50 items and they are organised in a circular manner. This means that the latest alarm rewrites the oldest one. Each alarm occupies two to three lines. The first line contains alarm name and last change, which indicates whether the alarm is active or not active. The second line indicates the type of the alarm and the third line contains date and time of activation/deactivation of the alarm.

The following table contains a list of all alarm messages. Proper function of all components monitored by a contact is indicated by closed contact.

Alarm name	Class	Alarm description
WHPump	B	Water heater pump failure from the pump breaker contact
SuppliedTemperature.AI	B	Temperature sensor is damaged, disconnected or incorrectly configured
WHTemperature	B	The temperature of air supplied when water heating is operational is lower than 6°C.
ElectricHeater	B	Information about electric heater failure on the basis of the state of thermostat contact.

Alarm name	Class	Alarm description
ElectricHeaterDI	B	Incorrectly configured electric heater input
OutletFilter	C	Outlet filter clogging from the manostat contact
2OutletFilter	C	Second outlet filter clogging from the manostat contact
OutletFilterDI	B	Incorrectly configured outlet filter manostat input
2OutletFilterDI	B	Incorrectly configured second outlet filter manostat input
InletFilter	C	Inlet filter clogging from the manostat contact
2InletFilter	C	Second inlet filter clogging from the manostat contact
InletFilterDI	B	Incorrectly configured inlet filter manostat input
2InletFilterDI	B	Incorrectly configured second inlet filter manostat input
FatFilter	C	Fat filter clogging from the manostat contact
2 FatFilter	C	Second fat filter clogging from the manostat contact
FatFilter DI	B	Incorrectly configured fat filter manostat input
2 FatFilter DI	B	Incorrectly configured second fat filter manostat input
Burner	B	Information about burner failure on the basis of monitoring of contact informing about its state
2Burner	B	Information about second burner failure on the basis of monitoring of contact informing about its state
BurnerOperDI	B	Incorrectly configured gas burner operation input
2BurnerOperDI	B	Incorrectly configured second gas burner operation input
BurnerFailureDI	B	Incorrectly configured gas burner failure input
2BurnerFailureDI	B	Incorrectly configured second gas burner failure input
CoolingWaterTemperature .AI	B	Temperature sensor is damaged, not-connected or incorrectly configured
Cooling	B	Information about cooling failure on the basis of monitoring of contact informing about its state
CoolingOperDI	B	Incorrectly configured cooler operation input
CoolingFailureDI	B	Incorrectly configured cooler failure input
2CoolingFailureDI	B	Incorrectly configured second cooler failure input
3CoolingFailureDI	B	Incorrectly configured third cooler failure input
OutletFlapValveDI	B	Incorrectly configured outlet flap valve open/close control input
2OutletFlapValveDI	B	Incorrectly configured outlet flap valve open/close control input
AIExchangerFlapValve	B	Gas exchanger bypass flap valve position monitoring damaged, disconnected or incorrectly configured
CondUnitCoolingDI	B	Incorrectly configured condensation unit cooling input
CondensationUnit	B	Information about condensation unit failure on the basis of monitoring of contact informing about its state
CondUnitHeatingDI	B	Incorrectly configured condensation unit heating input
AirQuality	C	Bad air quality indicated by contact or analogue sensor according to limit values *On* and *Off* in the *AirQuality* component.
AirQuality.AI	B	Air quality sensor is damaged, disconnected or incorrectly configured
Air quality.DI	B	Incorrectly configured air quality sensor input

Alarm name	Class	Alarm description
WHStartLowTemperature	C	Low temperature of outlet water at low temperature of outdoor air at the start of the unit according to limit values *StartWaterTemperature* and *LowOutdoorTemperature* in *WaterHeater* component.
OutletTemperature.AI	B	Temperature sensor damaged, disconnected or incorrectly configured
2OutletTemperature.AI	B	Temperature sensor damaged, disconnected or incorrectly configured
WHOutletWater	B	Water heating outlet water temperature is lower than 6°C
DefrostingDI	B	Incorrectly configured condensation unit defrosting input
2DefrostingDI	B	Incorrectly configured second condensation unit defrosting input
3DefrostingDI	B	Incorrectly configured third condensation unit defrosting input
Fire	A	Fire danger signalization by contact
RoomTemperature.AI	B	Temperature sensor is damaged, disconnected or incorrectly configured.
2 RoomTemperature.AI	B	Temperature sensor is damaged, disconnected or incorrectly configured.
3 RoomTemperature.AI	B	Temperature sensor is damaged, disconnected or incorrectly configured.
4 RoomTemperature.AI	B	Temperature sensor is damaged, disconnected or incorrectly configured.
RecuperatorFC	B	Recuperator drive frequency converter failure from frequency converter contact
FCDIRecuperator	B	Incorrectly configured recuperator frequency converter input
RecuperatorPMO	B	Freezing of recuperator signalized by the contact of manostat or temperature sensor downstream the recuperator according to the value of *Freezing* in the *Recuperator* component.
RecuperatorPMODI	B	Incorrectly configured recuperator anti-freeze protection input
SpalinyTeplota.AI	B	Temperature sensor is damaged, disconnected or incorrectly configured
Service	C	Information about the next scheduled service intervention according to the value in the *NextService* component.
VentilationTemperature	A	Low or high ventilation temperature signalized by the supplied air temperature sensor on the basis of parameters *LowVentilationTemperature* or *HighVentilationTemperature*
WHThermostat	B	Low temperature of air from the capillary tube of water exchanger anti-freeze protection
2WHThermostat		Low temperature of air from the second capillary tube of water exchanger anti-freeze protection
ThermostatWHDI	B	Incorrectly configured water heater thermostat input

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Alarm name	Class	Alarm description
2ThermostatWHDI	B	Incorrectly configured second water heater thermostat input
OutletPressureAI	B	Outlet fan air pressure sensor is damaged, disconnected or incorrectly configured
InletPressureAI	B	Inlet fan air pressure sensor is damaged, disconnected or incorrectly configured
HeatWaterTemperature.AI	B	Temperature sensor is damaged, disconnected or incorrectly configured
OutdoorTemperature.AI	B	Temperature sensor is damaged, disconnected or incorrectly configured
OutletFan	A	Outlet fan drive frequency converter failure from the frequency converter contact
OutletFanDI	B	Incorrectly configured outlet fan frequency converter input
2OutletFan	A	Second outlet fan drive frequency converter failure from the frequency converter contact
2OutletFanDI	B	Incorrectly configured second outlet fan frequency converter input
VentilationFailure PO	A	Low ventilation temperature during gas heating failure according to *BurnerFailure* value in the *Fan* component.
InletFan	A	Inlet fan drive frequency converter failure from the frequency converter contact
InletFanDI	B	Incorrectly configured inlet fan frequency converter input
AirHumidity	C	Bad air humidity by contact or analogue sensor of limit values *On* and *Off* in *Humidity* component
AirHumidityAI	B	Air humidity sensor is damaged, disconnected or incorrectly configured
HighFlueGasTemperature	B	High temperature of flue gases according to the value *FlueGasMax* in component *GasHeating*, at which the burner turns off.

Tab. 1 – List of alarm messages

Release	15	Fan start conditions

✎	"Release" value, which is necessary for starting fans, is calculated as the sum of the following conditions. It must be at least 15: 1 – No failure blocking the fan function is present 2 – An operating mode is selected (Comfort, Economy, Protection) 4 – Low or High ventilation temperature is activated 8 – Standard operating request for turning On fans (heating, cooling, ventilation) 16 – Forced On with higher priority than standard operating request.

Tab. 2 – Fan release

Release	15	Heating and cooling components start condition

	"Release" value, which is necessary for starting heating or cooling component, is calculated as the sum of the following conditions. It must be at least 15: 1 – No failure blocking the component function is present 2 – Not used 4 – Release of function from lower component in the heating or cooling sequence 8 – Standard operating request (heating, cooling) 16 – Forced On with higher priority than standard operating request.

Tab. 3 – Release of heating and cooling components

This description is valid for control unit equipped with Climatix hardware, including software KJVVS090016.25 or higher version.

The softwre type can be found in *Parameters ⇌SystemParameters ⇌ InfoAplications*

Name of Alarm described in the brackets was used in the older software versions.

It is recommended to shut off the switchboard with the controller for a limited time only, because even if the air conditioning unit is Off, the controller carries out some control functions. If the unit is Off for a long time (more than 3 days), the time setting of the controller may be lost and the air conditioning unit may not run according to the time schedule.