OPERATING INSTRUCTIONS H-CONTROL

1. IN GENERAL

This operating manual contains important technical and safety instructions for the safe use, installation, and operation of the control system. Please read this manual carefully before assembling, operating, or carrying out any other work on the air-handling unit's measurement and control system.

2. DESCRIPTION

The measurement and control system set consists of a power part, auxiliary circuits, sensors, actuators and a digital program controller. The designs differ from each other by the range of control circuits, elements, and equipment of the air-handling unit. The core of this control system consists in electrical switchgear containing appropriate elements for control, regulation and operation of the air-handling unit.

3. SAFETY INSTRUCTIONS

Valid regulations, functional tests and controls will provide you with high utility value, efficiency, and a long service life of the measurement and control system. Nevertheless, these devices may present a danger if they are operated by unskilled personnel or installed and used in violation of this manual or in violation of the applicable operational and safety regulations specified by the directives.

ELECTRICAL EQUIPMENT

Warning label alerting to electrical equipment! Risk of electric shock!

- Operation of the electrical equipment installed inside the switchboard accessible without the use of a tool (plastic version) can be carried out by a person without an electrotechnical qualification.
- This operator can control all the devices accessible after opening the switchboard door (the main switch, controller with control buttons, etc.)
- In the switchboard design that is accessible only using a tool (steel-lined version), an operator without electrotechnical qualification can operate only devices accessible from outside this switchgear (the main switch, control panel, etc.).
- The main switch is used for both service and emergency shutdown.
- An operator with electrotechnical qualification in terms of Decree No. 50/1978 Coll. may connect the switchgear to the power supply network, connect devices to the appropriate terminals, and perform operation and maintenance of these devices.

OTHER DANGERS

Warning label indicating other risks and dangers!

- Parts of the air-handling unit marked with this symbol indicate a risk to the operator; this applies especially to the fan's rotating parts and other hazardous parts.

4. EQUIPMENT INSTALLATION AND OPERATION

- The device may be assembled and connected by a person with the appropriate electrotechnical qualification in terms of Decree No. 50/1978 Coll. and appropriate regulations.
- The switchgear is installed either on the air-handling unit or on the wall.
- The main switch must be 0.6 - 1.9 m above the service level after installation.
- The service door of the air-handling unit and switchboard must be closed during operation.
- Use appropriate mounting aids to install the device.
- Operation must be carried out according to the manufacturer's safety instructions and operating conditions.

5. EQUIPMENT REPAIRS AND HANDLING

- Any switchboard operation requires the main switch to be switched off.
- In the event of malfunction of individual switchboard components, contact a service organization.
- The manufacturer assumes no liability for any damage resulting from the use of the product in any manner other than those specified in this manual; in particular its misuse and failure to comply with the recommendations and warnings.
- Any other use or connection of the product other than those described in the manufacturer's instructions is considered to be improper, and the manufacturer assumes no responsibility for the consequences of such operation.
- Furthermore, the manufacturer is not responsible for damage or destruction of the product due to inappropriate placement, installation, improper use, or use of the product in violation of these instructions for use.
- The manufacturer is not responsible for malfunction, damage, or destruction of the product due to incompetent replacement of parts or the use of non-original spare parts.
- The manufacturer is not responsible for loss of or damage to the product by natural disasters or other effects of natural conditions.
- The manufacturer is not responsible for damage to the product resulting during its shipment.
- The manufacturer does not provide any warranty for data loss or damage.
- The manufacturer assumes no responsibility for any direct or indirect damage caused by use of the product in violation of this manual or its failure due to use of the product in violation of this manual.
- When installing and using the product, legal requirements or technical electrical installation standards must be adhered to. The manufacturer is not responsible for damage or destruction of the product or for any damage incurred by the customer if the product is handled in violation of the applicable standards.

6. TRANSPORT AND STORAGE

- Switchboards and measuring and control system components can only be shipped properly wrapped and protected from adverse effects.
- The device must also be protected from shocks and falls.

- The device can be stored according to CSN EN 60721-3-1 in IE12 warehouses in dry and dust-free places without the risk of mechanical damage.
- If the storage period exceeds 1 year, check the integrity and functionality of each element before installation.

7. OPERATING CONDITIONS

The switchboards are, per the installed power, ready for connection to a TN-S-type power supply system (at high power levels also for a TN-C-type network). The specific type is shown in the wiring diagram.

Power Supply System:	3,N,PE, AC 50 Hz, 230/400V, TN-S
Recommended supply line dimension:	Per the wiring diagram
Recommended supply line protection:	Per the wiring diagram.
Designed for these environments:	AA5, (AA3 only in its weatherproof version), AB4, AD3, AE5, AF2, AG1, AH1, AK1, AL1, AN3, AP1, AQ1, AR2, AS2, BA1

For proper functioning, the air-conditioning unit must be connected to the other equipment (heating, cold source, condensate drain, etc.)

It is necessary to observe the instructions for use / installation and operating instructions of the air-conditioning unit to which the H-Control system is to be applied.

8. COMMISSIONING

- The equipment may only be commissioned, connected, and tested by a person appropriately trained by the manufacturer with the relevant electrotechnical qualification according to Decree No. 50/1978 Coll.
- Before connecting it to the electrical system, inspect the connection of the air-conditioning unit to your local protection connecting terminal.
- To connect the switchboard to the electrical system, remove the front cover plate fastened with the four self-tapping screws (RVP switchboard).
- Before connecting the mains supply, the main supply line circuit breaker must be switched off.
- The mains supply is rated per the wiring diagram, and it is connected to the input terminals or the main switch. The phase wires are connected from the left of the "U", "V", "W", and the "N" and "PE" wires are connected to their respective terminals.
- Cable bushings may be installed at the switchboard top, bottom, or side, while maintaining the required IP protection.

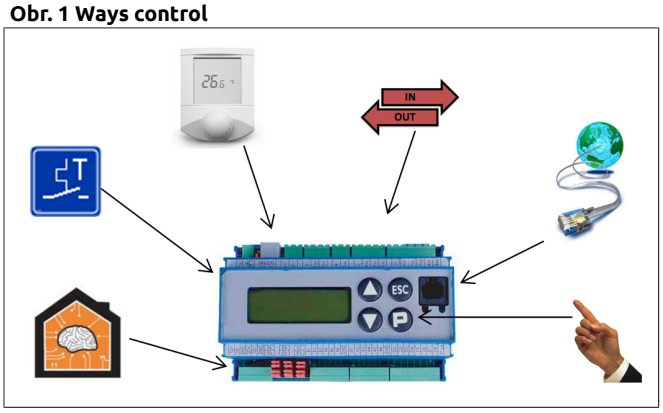
9. EXTERNAL DEVICES

- External devices not connected during production are mounted and connected to the switchboard per the wiring diagram and instructions for the installation or assembly of individual devices.
- In the event of malfunction of individual components, contact a service organization.
- The manufacturer is not responsible for mechanical or electrical component damage caused by unprofessional handling or improper connection or inappropriate installation of the device.

10. SYSTEM CONTROL

The air-conditioning unit may be operated in several ways:

Obr. 1 Ways control



10.1 CONTROL THROUGH WEB ACCESS

Every H-Control controller features its own web server with the option to view the system statuses and set all of its parameters. The connection may be based on the UTP network cable and RJ45 connector at the front section of the controller. Use a crossover cable to connect directly to your PC network card. Use a straight (non-crossover) cable to connect to a network using a hub. Any Internet browser (Internet Explorer, Mozilla Firefox, Opera, Google Chrome, etc. ...) with JavaScript support may be used for viewing.

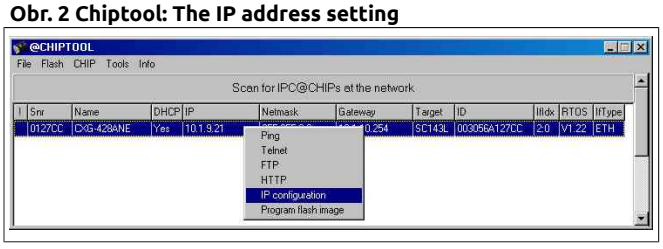
The controller interface is available at http://xxx.xxx.xxx.xxx, where instead of xxx the actual controller IP address is added.

10.1.1. IP ADDRESS SETTING

The controller IP address may be set by the "@CHIPTOOL" tool, which is available on the enclosed CD, or you may download it at http://www.cic.cz/ke-stazeni. Once installed and started, the program searches for the controller located on the local subnet of the computer on which it is running. If the program cannot find the controller, check the UTP connection cables, and make sure the controller IP address displayed on the controller display is in the subnet of your network connection settings.

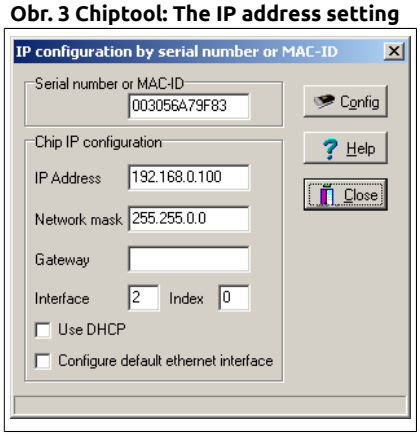
The controller may obtain an address from a local DHCP server when it is operational on the local network, or it may be assigned a fixed IP address, subnet mask, and default gateway.

Obr. 2 Chiptool: The IP address setting



The IP address setting is completed in the "@CHIPTOOL" program by right clicking on a selected controller and selecting "IP configuration".

Obr. 3 Chiptool: The IP address setting



For more information about IP address setting, see: “H-Control Installation Instructions TP12109NI_EN".

10.1.2. INTERNET BROWSER

If you run a web browser by entering a valid controller address http://xxx.xxx.xxx.xxx (you enter the actual IP address instead of xxx), the main window will appear.

For problems connecting your web access, see the document: “H-Control Installation Instructions TP12109NI_EN".

If the main screen is displayed, log in to the system. Press the "login" button and log in to the required service level. In the "login" column, click on the grey field of the "new group" line and enter the "access level". Then click on the grey field of the "password" line in the same column and enter a valid password (it will be provided by your service organization).

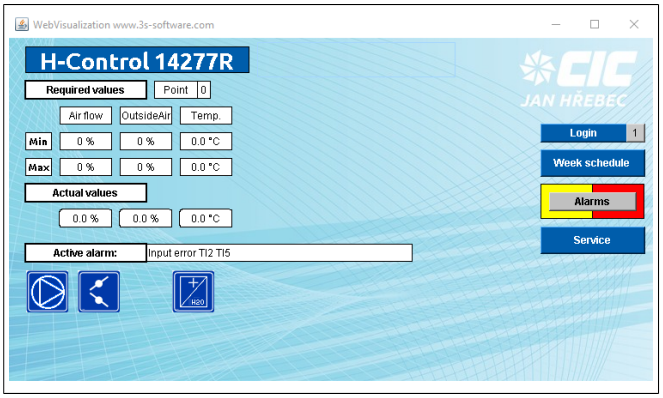
Access levels:

7	Default setting, no password.	Allows you to see the main window and display alarms.
6	No password from production.	Allows you to display alarms and a weekly program.
5	No password from production.	Allows you to set desired values and a weekly program.
4	Maintenance – password.	Allows setting of required values, weekly program, and deleting the alarm log.
3	Service – password.	It allows access to the service level and setting of frequency converters, inputs/outputs, and operating parameters.
2	Service 2 – password.	It allows access to the service level, allows you to control the Modbus bus.
1	Service 2 – password.	It allows access to the service level, allows Modbus bus control and setting of the frequency converters, inputs/outputs, operating parameters, and PI controllers.
0	Factory settings – password.	All the parameters may be changed.

The factory-set password for the "4 maintenance" level is "33". The access password for the "Service" level should be requested from the installation/service organization in charge of this system.

Main Screen

Obr. 4

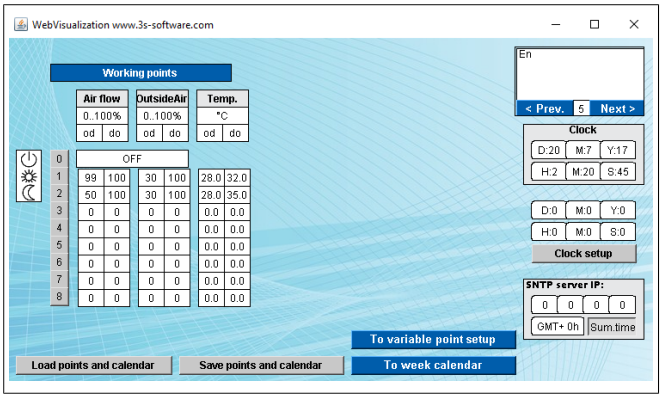


The top left section displays the desired values and current working mode (point), required min. and max. values of the controlled quantities. The desired values may be changed through the screen. Their change will be reflected in the unit's behaviour immediately. Below the required values, the system displays the current values of the controlled quantities.

Working Mode Setting

This menu may be found below the "Weekly program" button on the visualization or "Work points" on the controller buttons.

Obr. 5



Here, the values for the individual work points are entered. Depending on the unit configuration, it is possible to choose the range within which the controller will maintain:

Required Air Flow	specified in % of the rated fan speeds
Required Outside Air Percentage	it specifies the fresh air mixing ratio
Required Air Temperature	it specifies the required reference temperature
Required Air Humidity	it specifies the required reference humidity
Required Air Quality	it specifies the required reference air quality

- if the "from" value is the same as the "to" value, the device works exactly with this value
- if the "from" value is lower than the "to" value, the device can control the given value within the selected range

Editing of the required values will only take effect after a change in mode (working point); however, if you want it to be retained even after the controller has been switched off/on, you need to save it using the "Write points and calendar" button.

The "Load Points and Calendar" button retrieves previously saved values from the controller's memory.

If the current working point required values be overwritten, this change will only affect the unit’s run when the working mode (point) is changed.

Individually set working points may be activated either through digital inputs of the controller, remote control, controller buttons,

software thermostats, superior system, weekly calendar, or by directly pressing a web interface button.

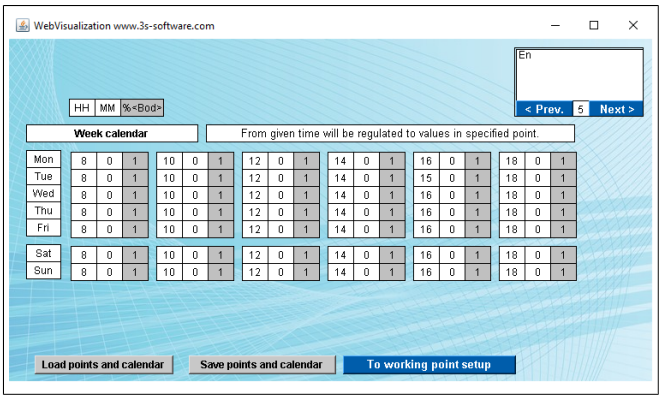
Run Requirement

1. if STOP is requested, the unit will stop at the priority (alarm request, "P" button on the controller display, digital input, remote control off, etc.).
2. if there is no STOP request and there is a request to run according to a specific working mode (point), (digital inputs, switching from the remote control, etc.), the unit operates according to this mode (point). If multiple working modes (points) are required to run simultaneously, the mode (point) with the higher order number is activated. The request to run per a given working mode (point) becomes active immediately.
3. if there is no STOP request or a unit run request, and a timer program is set, the unit operates according to the timer program set via the web user interface. The run by a timer program is updated every completed minute, so any online changes will not be reflected until this update.

Weekly Program

You may also set a weekly calendar in the working points setting menu. In one day, it is possible to set up to 6 moments when the working mode (point) is changed. In the first two fields, the hour and minute of the change are entered, in the grey field, the number of the working mode (point) is entered, (point 0 = STOP).

Obr. 6

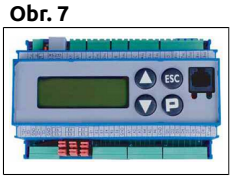


In order for the timer program to work, it is necessary to select the time data for every day in ascending order. If the time data are not ascending or the same activation times are selected for the same day, the timer program will not work! (See the weekly calendar setting example)

> **WRITE POINTS AND CALENDAR**
> Upon setting the weekly calendar, be sure to press the "Write Points and Calendar" button to save the set values.

10.2 CONTROLLER BUTTONS (MANUAL CONTROL)

Obr. 7



The system may be operated through the buttons located on the control panel of the controller, which is located inside the switchboard.

The controller display is capable of displaying 8x20 characters and displays the main working modes of the unit.

```
CIC Jan Hrebec 12345
2015-01-01-11:12:13
IP: 192.168.0.100
No fault RUN0
```

Buttons

▲ ▼- menu browsing / value changes. A brief press changes the value by one unit / a longer press causes a continuous change

P - submenu selection, when the first line character is ">" / value confirmation (saving)

ESC - leaving a submenu, cancellation of value change

10.2.1. MENU

Line 1 `CIC Jan Hrebec 12345`
It shows the company logo and unit / switchboard serial number

Line 2 `IP: 192.168.0.100`
Controller web interface IP address. The switchboard is available through http://xxx.xxx.xxx.xxx, where instead of xxx the actual controller IP address is added.

Line 3 `2015-01-01-11:12:13`
It displays the current system time. If the time changes continuously, the controller is working correctly. If the system time has stopped, you must restart the controller by disconnecting its power supply.

By pressing the "P" button, it is possible to access the system time setting.

Line 4 `No fault RUN0`
It displays the current system status and current working mode (RUNx point).

Equipment STOP:
By pressing the "P" button on the controller keypad on line 4 of faults and working points, you may toggle between the STOP states when the unit is stopped and RUN when the unit is running automatically per the set working modes (points) or a timer program. The bottom right display shows STOP or RUNx, where x is the working mode number (point), which is currently followed by the unit. If the unit is in its STOP state, it cannot be started in any other way.

Fault Confirming:
Some malfunctions or warnings that may occur during device operation are displayed until the operator acknowledges their acceptance (confirmation). Such a fault may be confirmed by pressing the "ESC" button on the controller keypad on the main screen.

Line 5 `Current Values`
Display of the current (actual) values that the AC assembly can measure and control

`Outside Air`

`T_ODA (outside)°C` Outside air current temperature

`F_ODA (% c.v.)` Current fresh air %

`Supplied Air` The subgroup contains current measured values

`Exhaust Air` The subgroup contains current measured values

`Waste Air` The subgroup contains current measured values

`Reference` The subgroup contains current measured values

Line 6 `Required Values`
Current required values used for controlling

`Air Flow`

`V_SET_MIN %` - set min. power

`V_SET_MAX %` - set max. power

`V_ACT %` - current power

the same values may be displayed for:

`Fresh air`

`Temperature`

`Relative humidity`

`Specific humidity`

`CO2 value`

Line 7 `Working Points`
Setting of working points, their required values, and the option to directly select the working point and list of working points

`Current working point: X` is the current working point number

`STOP:` stop

`POINT1:` point No. 1

`POINT2:` point No. 2

...

`POINT8:` point No. 8

`WEEK:` weekly program

Working point active selection shortcuts from: DI - digital input, VIS - PLC/web button, UI010 - remote controller, BMS - superior system, TS - software thermostat

Line 8 `Weekly Program`
`Monday:` (monday program)

Modifications of Monday time 1:

`HOUR: 10`

`MIN: 30`

`POINT: 5`

Modifications of Monday time 2:

`HOUR: 12`

`MIN: 30`

`POINT: 0`

...

`Save day = P` - it saves the values

This setting causes the unit to start running per its working point No. 5 on Monday at 10:30 a.m. and to turn off on Monday at 12:30 p.m. The same rules apply to the other weekdays.

Line 9 `Alarms`
`Current Alarms` - A list of specific current faults and warnings.

Line 10 `Password`
`Password` - It is used to enter a service password to unblock the system (not for setting modes and access to service levels, etc.)

10.3 CONTROL THROUGH THE SUPERIOR SYSTEM

If there is a request for control from a superior system, the switchboard is equipped with adequate equipment for connecting these systems. These connections are described in special sets of instructions. The required values and working points may then be overwritten by the superior system.

10.4 CONTROL THROUGH DIGITAL INPUTS / OUTPUTS

The system run may be controlled through digital inputs. The control voltage of these inputs is 24 V DC. Required values and working modes (points) may then be called up through digital inputs. Assigning functions of digital inputs may be selected in the service menu as well as digital output functions for reporting different system states.

10.5 CONTROL THROUGH SOFTWARE THERMOSTATS

The software thermostats serve as freely programmable switches of digital outputs or work mode (point) requirements, depending on the measured temperature or analogue value. They work as switches with hysteresis that may be set. Required values and working modes (points) may then be called up through software thermostats.

10.6 CONTROL THROUGH ROOM CONTROLLER

10.6.1. MAIN FUNCTIONS

The room controller is an optional accessory. You may use it to select working modes and display basic system states. The room controller is connected to the programmable controller via the RJ 12 connector, which is located on the top of the controller. The display shows various pieces of information - see the figure.

Obr. 8



Numbers 1..7 - Day of the week. 1 = Mon, 7 = Sun.

2-digit 4-segment display - Current working point number.

Main display - Reference values alternating with system time.

Obr. 9



Information Symbols

- The unit is heating
- The unit is cooling
- The unit is humidifying or dehumidifying
- The unit operates with air-quality control

Warning Symbols

- General warnings, such as clogged filter elements, low priority alarm
- General fault – An exact textual description is displayed on the controller display in the control unit and its web interface

10.6.2. CONTROL

The equipment is controlled by briefly pressing the control knob, which switches between the working points:

Point 0 Off

Point 1 Set mode of working point No. 1 (daily run)

Point 2 Set mode of working point No. 2 (daily run)

Weekly program Mode set per a timer program

As long as the unit does not switch from its current to its newly selected mode (point), the working mode symbols on the room controller are lit simultaneously. The other working modes (points) cannot be selected on the room controller. They may only be selected in other ways, i.e.: through the buttons, web access, dig. inputs, etc.

You may assign various required values to every working mode (point) - see the "Setting Working Modes". When changing the working mode (point) through the room controller, the required system values are set per the current (last selected) working mode (point).

On the main display, the reference values of the controlled quantities and system time alternate at regular intervals. Note: If the data communication with the unit fails, time updating will stop.

When the control knob is turned, the required temperature is set. It is confirmed by pressing the knob. This change only persists till the next working mode (point) change.

NOTE

If the unit operates in its timer program, this change will always occur with every working mode (working point) change per a weekly program, i.e., at least 6 times a day.

10.6.3. SUPPLEMENTAL FEATURES (IF AVAILABLE)

When the control knob is pressed for a longer time (approx. 2 sec.), you will switch to a selection of other adjustable parameters, providing they are available. By turning the control knob in this state, it is possible to change the flashing group as follows:

- 40% rH - required air humidity (in units with humidity control
- 80% - required minimum fresh air amount (in units with mixing)
- ppm CO2 - required CO2 amount
- M A required manual fan RPM:
- A – automatic, changes per the current working mode (point)
- M – fixed manually set fan RPM of 50/75/100% (Note: When this manual mode is active, the RPM may only be changed by switching the RPM back to its A-automatic mode)

10.7 ENERGY SAVINGS

There are 6 independent modes of operation that together control how the various heaters and coolers in the unit are used or shut down. When all inputs are turned off, the unit operates with all air treatments physically available.

In the visualization, energy savings can be accessed via Service / Energy Savings. This screen sets up and displays the overall behavior of the air handling unit, which affects its consumption of various energy types.

These inputs can be controlled (switched on and off) from the visualization (summer heating ban) or automatically (quarter-hour maximum) from digital inputs, H-Visu visualization, H-Touch controller, Modbus or Bacnet. Setting of digital inputs is in Service/ Parameter Settings/IN3.

Some heaters or chillers will be shut down during operation, and the unit will have a reduced ability to make air adjustments from the design parameters.

The inverter condensing unit (CI) can function as an electric heater and/or an electric chiller depending on the configuration. Each of these functions is controlled separately.

10.7.1. E-MAX

Corresponds to the signal monitoring 1/4 hour maximum power consumption. During the activation period, all air treatments that require a high electrical input (condensing units for heating and cooling, electric heaters, dehumidification, etc.) are switched off. Air flow is not affected.

10.7.2. FREECOOLING

It is used in summer to cope with high temperatures and to cool the ventilated space at night.

In this mode, all heaters are shut down at all times. If the outside temperature is suitable (low), the unit tries to cool the space down to the minimum required temperature. If the maximum desired temperature is exceeded, the unit actively cools.

10.7.3. NO ACTIVE HEATING

Turns off all heaters. The mixing and heat recovery functions are maintained. Suitable for the summer period when there are cool nights when it is not desirable to heat the air as there will be enough heat during the day.

10.7.4. NO ACTIVE COOLING

Switches off all coolers. The mixing and heat recovery function is retained. Suitable for winter and transitional periods when you do not want to use cooling yet.

10.7.5. NO ACTIVE HEATING WITH NON-ELECTRIC HEATERS

Same as No active heating, but only applies to non-electric heaters (water, gas, steam heating). Suitable, for example, for the summer period when the hot water boiler is shut down but you want to heat with an installed condensing unit or electric heater.

10.7.6. NO ACTIVE COOLING WITH NON-ELECTRIC CHILLERS

Same as No active cooling, but only applies to non-electric chillers (water, ammonia chillers). Suitable for periods when the central chiller plant is shut down. Cooling by an installed inverter condensing unit is allowed.

11. FAULT AND WARNING CONDITIONS

The system reports its current fault and warning conditions in various ways, through the room controller with its warning symbols (see the room controller operation), control panel display, red controller LED, digital outputs, BMS data points, and web visualization, using text messages

11.1 WARNING CONDITIONS (WARNINGS)

Less significant fault or exceptional working condition. It is marked yellow and has no significant effect on the air-conditioning unit's operation.

11.2 FAULT CONDITIONS (ALARMS)

Less significant fault or unacceptable working condition. It is marked red and has a significant effect on the air-conditioning unit's operation.

Every fault or warning may be:

- so-called auto-confirmable, which means that if the cause of the fault or warning condition does not last, the system will automatically return to its original state.
- so-called manually confirmable, which means that after the fault cause is removed, the operator's manual intervention is required to return the system to its original state. Such a fault may be confirmed by pressing the "ESC" button on the controller keypad on its main screen. Also by pressing the "Confirm Faults" button in the web visualization that you will find under the "alarms" menu or through the superior system.

The web visualization may also display the alarm log (fault log) with specific dates and times of individual faults and warning conditions.

11.3 LIST OF ALARMS

Č.	Display Message	Meaning
0	No fault	Regular condition with no fault
1	Unit activation	Unit start log. field
2	External STOP	Unit setting through its external dig. input (EPS, etc.)
3	Supply filter 1 clogged	Supply air filter 1 clogged
4	Supply filter 2 clogged	Supply air filter 2 clogged
5	Exhaust filter 1 clogged	Exhaust air filter 1 clogged
6	Exhaust filter 2 clogged	Exhaust air filter 2 clogged
7	Supply fan fault	Supply fan communication/ inverter/drive fault
8	Exhaust fan fault	Exhaust fan communication/ inverter/drive fault
9	ZZT drive fault	Rotary heat recovery communication/inverter/drive fault
10	ZZT frost!	Heat recovery anti-frost protection
11	OV-frost!	Hot water heater anti-frost protection
12	OV-frost warning!	Hot water heater anti-frost protection (warning)
13	OE-overheating 60 deg.C	Electric heater minor (working) overheating (60°C)
14	OE-overheating 80 deg.C	Electric heater serious overheating (80°C) - Manual confirmation necessary
15	TC - Low pressure	Heat pump – Refrigerant leaked from cooling circuit No. 1
16	TC - High pressure	Heat pump – Circuit blocked or poor cooling of condenser No. 1
17	TC - Phases, EVD, ...	Heat pump - Supply system phase order changed or EEV valve fault
18	ZP - Humidifier fault	Steam humidifier fault
19	Watchdog	System restart
20	TC - Terminal temperature	Limited or no condenser cooling, non-functioning fan of condenser No. 1
21	CI - Inverter fault	Inverter condensing unit fault
22	CV - Heat exchanger freezing	Water cooler anti-frost protection
23	TC - Compressor 1.1 fault	Communication/inverter or heat protection and compressor No. 1 components fault
24	OG - Aftercooling	Gas burner working aftercooling
25	OG - Burner fault	Gas burner equipment fault
26	CP - Condensing unit fault	Condensing unit fault
27	OV - Pump fault	Heater circulating pump overheating or fault
28	Supply filter 3 clogged	Supply air filter 3 clogged
29	Exhaust filter 3 clogged	Exhaust air filter 3 clogged
30	TC - Compressor 1.2 fault	Communication/inverter or heat protection and compressor No. 2 components fault
31	TC - Low pressure 2	Heat pump – Refrigerant leaked from cooling circuit No. 2
32	TC - High pressure 2	Heat pump – Circuit blocked or poor cooling of condenser No. 2
33	TC - Terminal temperature 2	Limited or no condenser cooling, non-functioning fan of condenser No. 2
34	OV2 - Frost!	Second hot water heater anti-frost protection
35	OV2 - Frost warning!	Second hot water heater anti-frost protection (warning)
36	OV2 - Pump fault	Second heater circulating pump overheating or fault
37	Order servicing	It is necessary to complete regular equipment servicing and maintenance
38	Air-conditioning blocked	The unit's run is blocked for various reasons
39	CV - Pump fault	Water cooler circulating pump overheating or fault
40	OE2 - Overheating 60 deg. C	Second electric heater minor (working) overheating (60°C)
41	OE2 - Overheating 80 deg. C	Second electric heater serious overheating (80°C) - Manual confirmation necessary
42	Supply fan warning	Some of the supply fan drives are not ready/have failed
43	Exhaust fan warning.	Some of the exhaust fan drives are not ready/have failed
44	Input fault	DI, TI, and AI input display, shorted/ disconnected or has no valid signal
45	CI - Invertor warning	One of the outside inverter units or its part has failed
46	OG1 - Overheating	Gas burner emergency thermostat equipment
47	TC - Refrigerant 1 leakage	Heat pump (1), refrigerant leaked from cooling circuit No. 1
48	TC - Refrigerant 2 leakage	Heat pump (2), refrigerant leaked from cooling circuit No. 2
49	TC - Compressor 2.1 fault	Communication/inverter or heat protection and compressor No. 2 components fault
50	TC - Compressor 2.2 fault	Communication/inverter or heat protection and compressor No. 2 components fault
51	TC - Warning	Heat pump circuit warning

12. MAINTENANCE

Recommended maintenance is carried out twice a year in the period before the winter and summer seasons. It is recommended to perform a complete functional check of the air handling unit and the control system (MaR).

List of maintenance tasks

- Check for clogging, non-damage and corrosion of the control cabinet.
- Clean and vacuum the dirt.
- Check the function of the main switch.
- Check the operation of circuit breakers and protections.
- Check and tighten terminals and connections.
- Check the function of the switching devices (contactors, relays, ...).
- Check the function of the controls.
- Check the function of the temperature and humidity regulators.
- Check the parameter settings of the frequency converters.
- Check the functionality of the fans (free running, balance, start and stop ramp times).
- Check the function of the frost protection.
- Check the function of the pump group.

- Check the function of the analog sensors (temperature, pressure, humidity, CO2, ...).
- Check the function of digital input sensors (presistors, thermostats, ...)
- Check the function of the actuators and the rotation of the dampers.
- Measure the operating currents of the fans and compressors.
- Check the protective connections.

Service and maintenance work may only be carried out by instructed and factory-trained personnel in accordance with the applicable operating and safety regulations and guidelines.

13. WARRANTY CONDITIONS

The product warranty is subject to the Warranty and Complaint Terms and Conditions TZRP_EN. Their current version is available for download at www.cic.cz.

The manufacturer reserves the right to make technical changes without prior notice.