CIC
JAN HŘEBEC

H-Control 14277R

Required values | Point 0

	Air flow	OutsideAir	Temp.
Min	0 %	0 %	0.0 °C
Max	0 %	0 %	0.0 °C

Actual values

| 0.0 % | 0.0 % | 0.0 °C |

Active alarm: HWcoil frost !

Login 1
Week schedule
Alarms
Service

CONTENT

1. BASIC INFORMATION

To control the run and control the heat output of air-conditioning units, it is necessary to install, connect, and inspect the MaR system's proper operation.

The measurement and control system set consists of a power part, auxiliary circuits, sensors, actuators, and a digital program controller. The designs differ by the air-condition units' range of control circuits and working conditions. The following steps may only be carried out by personnel who meet the qualification requirements of Regulation 50/1978 Coll. For installation, it is necessary to have a crossover UTP cable and portable PC with support software installed!

2. COMPONENT AND WIRING INSTALLATION

2.1 WIRING DIAGRAM

A part of the switchboard's accompanying documentation is a complete wiring diagram and a diagram of external device connections. See the example.

Pic. 1 Wiring diagram example
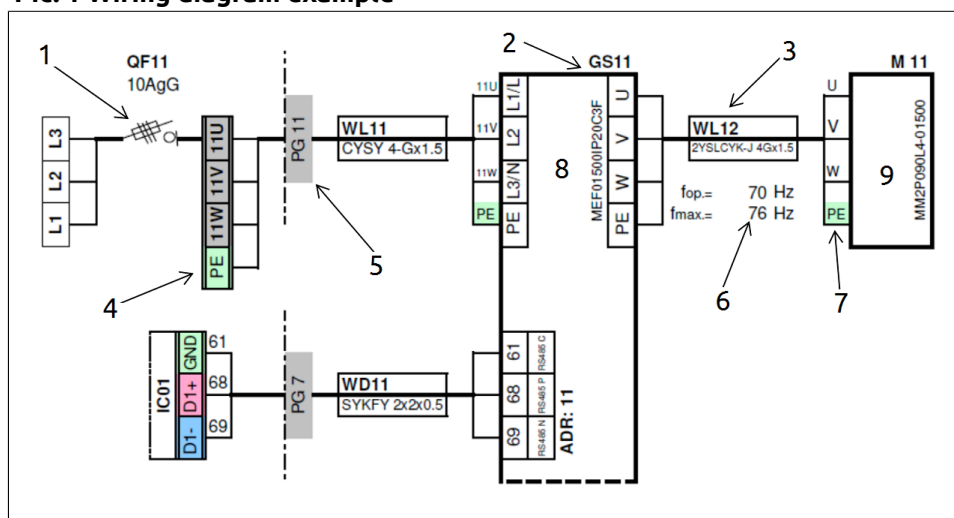
1. devices in a switchboard, 2. marking and description of the device, 3. marking and recommended cable type for the device, 4. clamps inside the rack, ONLY TYPES RVO!, 5. cable gland at the switchboard interface, 6. operating maximum drive frequency, 7. terminals of an external device, 8. inverter supply, 9. motor supply

We recommend that you adhere to at least the recommended cable cross-section; if a cable with a different cross-section is used, the connection line of the given terminal may not be sufficient! The types and cross-sections of power cables are recommended for installation in a pipe, wall, or cable duct for distances less than 20 m.

2.2 SWITCHBOARD

Switchboards made by C.I.C. Jan Hřebec are designed with IP 54 protection. Use appropriate cable bushings (included in the delivery) to secure this protection. The switchboard may be mounted vertically on plaster or in the free space of an HVAC unit.

⚠ SWITCHBOARD LOCATION

Always maintain the handling space around the switchboard – at least 800 mm!
After the switchboard installation, the main switch must be located at least
0.6–1.9 m above the service plane (measured from the floor).

RVO-type switchboards (steel-sheet metal cabinets) adequately connect to
your grounding system. They feature a grounding point. The switchboard is
only dimensioned to feed and control devices, which are necessary for the air-
conditioning unit's operation. Therefore, it is not possible to connect your own
devices to the switchboard!

2.3 SWITCHBOARD EQUIPMENT

The main and simultaneously emergency switch is used to completely
disconnect the air-conditioning unit from its power supply in the case of
servicing, an accident, etc. The power supply cable is connected directly to the
main switch terminals (switchboard plastic version) or the steel-sheet metal
switchboard terminals "U" (L1 phase), "V" (L2 phase), "W" (L3 phase), and
"N" and "PE" terminals. The switchboards are, per 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 system is fed by its 24V DC power supply. If the power
supply operates correctly, the green control light on its cover is ON. In the case
of overload or short circuit, this control light is OFF, or the "DC low" red control
light is ON.

ℹ CONNECTING WIRES TO RVP

The RVP-type switchboards (plastic boards) do not feature any terminals
inside their cabinets! The terminals of the individual devices (circuit-breakers,
contactors, relays, PLCs, etc.) are used for direct connections.

The whole system is controlled by a programmable H-Control controller.
With a simple clamping system, wires (max. 1.5 mm2 cross-section) may be
connected to the controller terminals. These wires feature no tubes. The
RS-485 communication line wires are connected to the controller and further
to the devices (frequency inverters) via the bus topology. The recommended
maximum total length of the RS-485 communication line is 100 m. It is
recommended to terminate the bus with terminating resistors on the last
device. Use shielded wires.

Pic. 2 MODBUS - bus topology
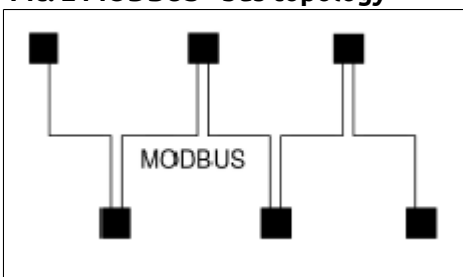
Pic. 3 MODBUS - example of execution
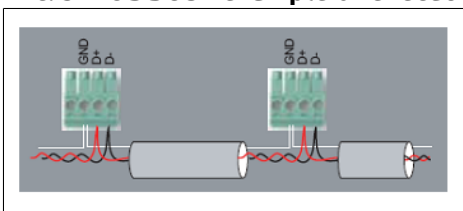
The internal wiring diagram of the programmable controller is shown in Appendix 1.

2.4 ROOM CONTROLLER

Pic. 4 Room controller

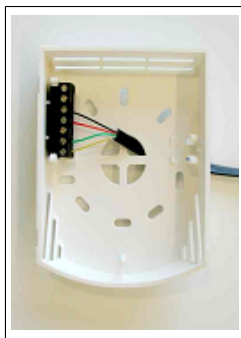It is connected via a 6-core telephone cable (supplied) directly to a connector on the programmable controller. At one end, the RJ12 connector is crimped, and the other is connected to the corresponding control unit terminals according to the wiring diagram. It is always necessary to verify communication with the remote controller. If the controller display does not show the updated time upon power supply connection (only zeros are displayed) and no symbols are illuminated, communication is not OK. Check the communication cable connection, especially the correct mounting of the RJ12 connector. The maximum length of the room controller wires is 100 m.

Pic. 5 Controller terminals diagram
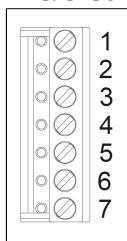
1. NC unconnected
2. NC unconnected
3. K- communication RS485 -
4. K+ communication RS485 +
5. TE (ground)
6. G0 power supply – reference point
7. G power supply - 24V DC

Pic. 6 Controller rear side
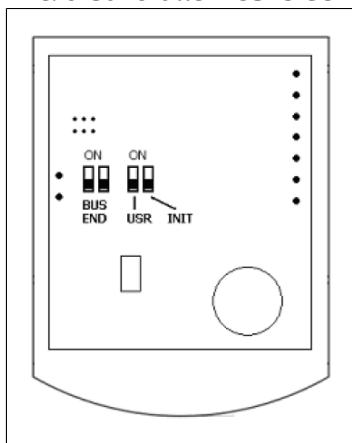
- BUS END: it terminates the bus in the ON position, we recommend using
- USR: not used, reserve

- INIT: sets the controller to its default communication parameters: address 1, baud rate 9,600 bps

2.5 FREQUENCY INVERTERS

Place the frequency inverters in a suitable location, using suitable screws. Fasten the wires through the cable bushings located in the frequency inverter terminal cover. To connect the wires to the inverter power terminals, use stranded wire bushings. The PE earth terminal is a screw connection, use cable lugs.
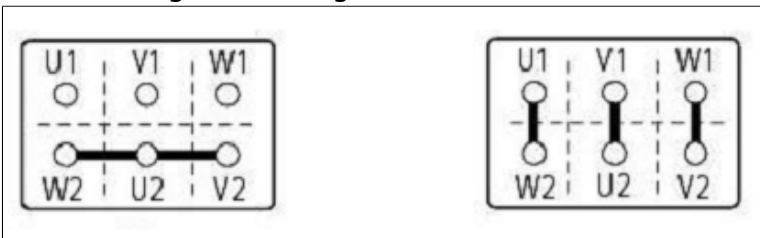
2.6 FAN ELECTRIC MOTORS

⚠ **MOTOR INSTALLATION**

Install the motors exclusively per the motor rating plate, not per the rating plate attached to the fan chamber door (they may vary).

The D/Y terminal strip connections depend on the voltage system to which the motor is connected. Beware of frequency inverters!

Pic. 7 Y wiring and D wiring

⚡ **SINGLE-PHASE INVERTER**

The frequency inverter powered by single-phase voltage of 1 x 230 V features 3 x 230 V voltage on its output side (therefore, the motor side); therefore, the motor terminal strip wiring must correspond to the 230 V motor label!

⚡ **THREE-PHASE INVERTER**

The frequency inverter powered by three-phase voltage of 3 x 400 V features 3 x 400 V voltage on its output side (therefore, the motor side); therefore, the motor terminal strip wiring must correspond to the 400 V motor label!

In the case of low power motors, tighten their terminal strip gently, otherwise, thread stripping may occur. Attach lugs to the supply wires.

2.7 DIFERENTIAL PRESSURE SENSORS

Wire the terminals per the wiring diagram. Filter clogging sensors are mostly connected to the frequency inverter terminals (GS11, GS21). Press the pressure outlets into the already prepared holes. If they are not prepared, pre-drill them. The "+" lead belongs to the higher pressure port (before the filter) and the "-" lead to the lower pressure port (after the filter). Set the pressure drop to a value greater than the pressure drop of the filter itself + clogging reserve. This information may be found in the contractual technical documentation.

2.8 ACTUATORS

Various types of actuators and various types of their control are used. The fresh and outgoing air dampers feature 24 V actuators of the open/closed type or 3-point control units. If an actuator rotates in the opposite direction, and is not accessible, its direction of rotation may be changed by swapping the polarity of its control wires.

Pic. 8 Three-points actuator
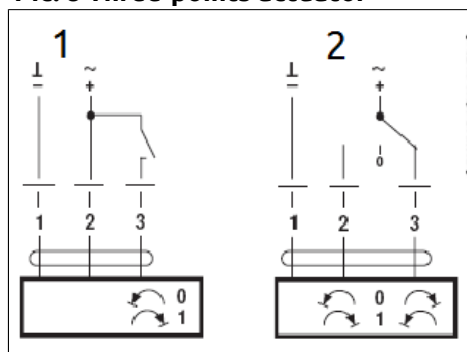
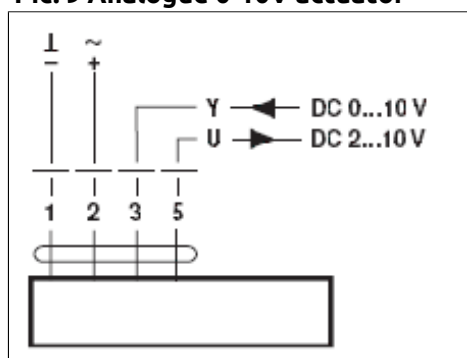1. opening and closing control, 2. 3 point control

For the control of continuous actuators (3-way valves, if all the damper actuators are mixed), actuators with continuous 0- V control are used.

Pic. 9 Analogue 0-10V actuator

These actuators feature relatively short supply wires, so it is necessary to mount a connection box into the unit in order to extend its supply wires. The connection box is mounted, as suitable, inside or outside the air-conditioning unit. To change rotation, use the rotary switch on the actuator.

Pic. 10 Selecting the direction of rotation of the actuator
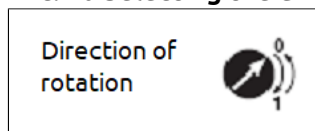
2.9 TEMPERATURE SENSORS

Temperature sensors are installed in the appropriate parts of the air-conditioning unit. For the cable-type temperature sensor, a threaded cable bushing may be used as a holder.

Pic. 11 A thermometer located in the Pg bushing
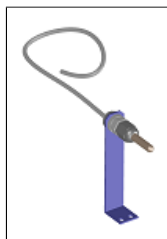
If a unit is equipped with a hot water heater, place the thermometer on the return water pipe as close as possible to the heat exchanger. This thermometer acts as anti-frost protection as well. The thermometers may be located as shown in the following figures:

Pic. 12 Example of thermometer locations
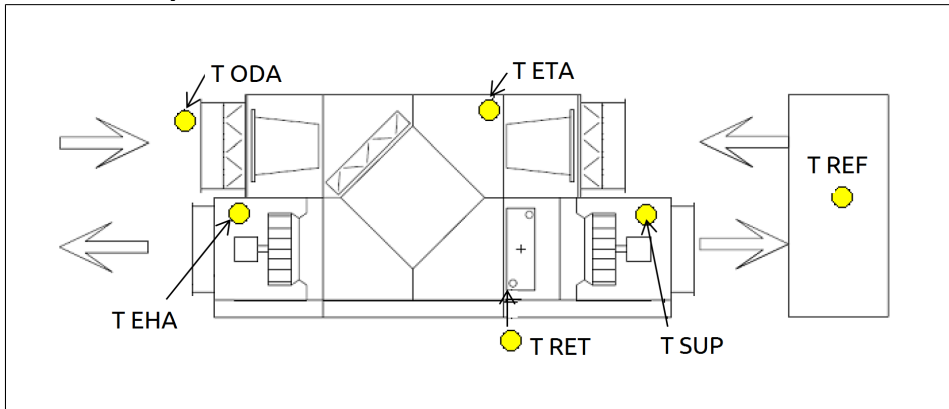
T EHA. outgoing air thermometer, T ODA. outdoor air thermometer, T ETA. exhaust air thermometer, T REF. space thermometer, T RET. return water temperature, T SUP. supply air thermometer

⚠ **FRESH AIR THERMOMETER**

The fresh (outside) air thermometer plays a critical role. If the air-conditioning unit features no mixing section, this thermometer may be directly placed in the outside air space. However, if the unit features a mixing section, it is necessary to install temperature sensors for every part separately.

Pic. 13 Example of thermometer locations – supply unit

T ODA. outdoor air thermometer, T RCA. circulating air thermometer, T SUP. supply air thermometer

2.10 CIRCULATING PUMPS

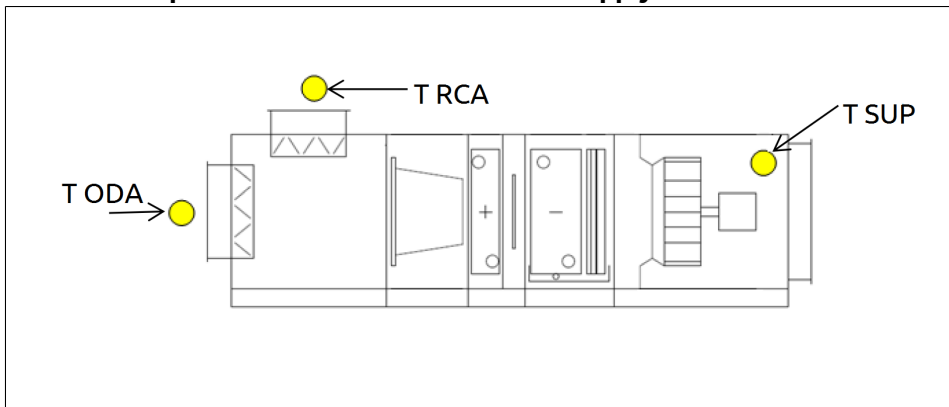The hot water heater pump, as well as the 3-way valve actuator, is located on the regulation point of the junction. Both the pump and actuator are connected per the wiring diagram.

⚠ **PUMP WORKING POSITION**

Pay attention to the circulating pump's correct working position!

If it is necessary to test the control system, and the heating system is not pressurized, do not let the circulation pump run "dry". In this case, it may be temporarily deactivated by a securing element inside the switchboard. The same rules apply to the water cooling circulating pumps.

2.11 ELECTRIC HEATER

It may be composed of several sections. Every section is switched either by a contactor or solid-state relay. When a solid-state relay is used, these relays are

mounted onto the base plate of the electric heater and are fitted with their aluminium cooler (factory fitted) on the air flow side. Attach twined wire lugs to the solid-state relay leads, or adequately bend the wires with rigid cores, and clamp them to the solid-state relay input terminals. Connect the thermostats per the wiring diagram, and verify their operation. The emergency thermostat must act as an irreversible fuse eliminating the heating rod power supply!

⚡ ASYMMETRICAL SECTION

The heater may contain one heating section of asymmetrical character. In such a section, it is always necessary to connect the neutral conductor in addition to the phase and protective conductors!

2.12 COMPRESSOR AND COOLING CIRCUIT

If the unit features its own compressor and cooling circuit, always connect the compressor motor with respect to the sequence of phases to maintain the desired direction of rotation. The motor terminals may be labelled L1, L2, L3, or U, V, W, or R, S, T.

⚠ DIRECTION OF ROTATION

The compressor must not rotate in the opposite direction to its working direction. With the correct direction of rotation of the compressor, the inlet line is significantly cooler than the outlet line, and its operation is silent.

Compressor motors are usually not Y/D switchable, and it is always necessary to verify their operating voltage and wiring per their ID plates. The cooling circuit protection elements are connected per the wiring diagram. High-pressure and low-pressure protection are based on switching contacts. Always check the pressure to which the protection is set. The pressure transducers are based on semiconductor sensors with 4–20 mA outputs for which the correct connection polarity must be maintained. None of the conductors leading around the cooling circuit may touch or be attached to this circuit, as this could result in their damage due to extreme temperatures.

3. SYSTEM ACTIVATION AND ITS INITIAL STEP-BY-STEP SETUP

3.1 POWER SUPPLY

The main H-Control switch is OFF. Upon complete system installation and wiring, initiate its activation.

1. Make sure 3 x 400 V input voltage is present at the switchboard input, and the supply cable features a sufficient size and sufficient superior protection.
2. Turn all the switchboard safety features, including the protection switch disconnectors for frequency inverters and other devices, to their "OFF" position.
3. Turn ON the main switch on the H-Control switchboard.

3.2 FREQUENCY INVERTERS

First, activate the frequency inverters for the fans or the rotary heat recovery. Make sure the control panels are mounted on the frequency inverters. The following procedure only applies to a single inverter. This procedure will be repeated with the other inverters.

1. Switch ON the adequate protection disconnector for the given inverter (e.g., QF11 for the supply fan).
2. The frequency inverter will "start running".
3. Press the "OFF/RESET" button on the inverter control panel to prevent the motor from rotating when the inverter is not calibrated yet.
4. Set the inverter to its factory settings. This may be done in two ways:
   a) set 0–51 parameter to [9]

   b) disconnect the inverter from its power supply, press and hold [MENU] + [OK], and while holding these buttons, turn ON the power inverters on the panel

   The factory setting is indicated by the frequency inverter through its "AL 80" message – press the [OFF/Reset] button and then [OK] to begin setting the specific parameters.
5. Since the frequency inverter is controlled through its RS-485 data line, set the communication parameters: When setting these parameters, the frequency inverter is still in its "OFF/RESET" mode.
6. Set the following parameters:
   - set parameter 8-30 to value [2] (Modbus)

   - set parameter 8-31 to the address value:

   [11] for the supply fan inverter

   [21] for the exhaust fan inverter

   [31] for the rotary ZZT inverter

   - set parameter 8-32 to value [2] (9600 Baud)

   - set parameter 8-33 to value [2] (no parity, 1 stopbit)

Pic. 14 Inverter control panel
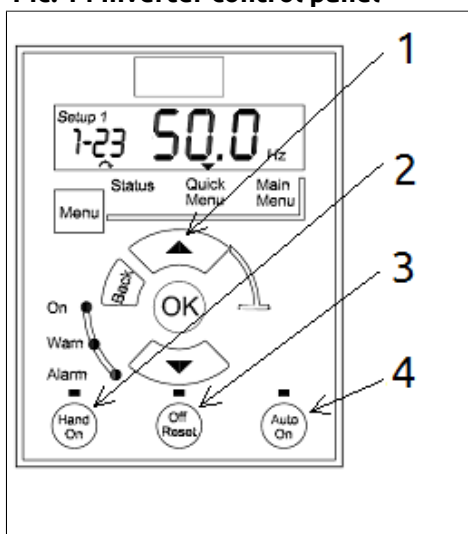
1. arrow up, 2. manual run mode, 3. permanently OFF mode, 4. automatic mode required for automatic run

Apply the same procedure (from item 1) to the other frequency inverters, only with different inverter addresses. The inverters in this state are adapted for bus communication; nevertheless, they are not fully set up or operational yet!

3.3 OTHER POWER CIRCUITS

Gradually turn on the other safety devices on the switchboard, including the power supply circuit breaker (FA09) for low 24 V DC supply voltage that will activate the H-Control controller itself. If the power supply operates correctly, the green control light on its cover is ON. In the case of overload or short circuit, this control light is OFF, or the "DC low" red control light is ON.

3.4 CONNECTING A PC TO THE H-CONTROL CONTROLLER

> ⚠ **EQUIPMENT**
>
> For installation, it is necessary to have a crossover UTP cable and portable PC with support software installed!

- Connect the PC with a crossover network cable to the controller in the switchboard (use a crossover UTP cable to directly connect the PC and controller, use a direct cable to directly connect the controller (e.g., to a hub).
- Run the "@CHIPTOOL" software tool – see it in the accompanying documentation on the enclosed CD. If you do not have it installed, do so, and run the program.
- If a status line indicates the controller found does not appear in the program, check:
- the use of a correct UTP cable - deactivated operating system safety elements that secure network communication, such as all the antivirus programs, firewalls, etc.
- activated local area network connection adapter

Pic. 15 Window @CHIPTOOL
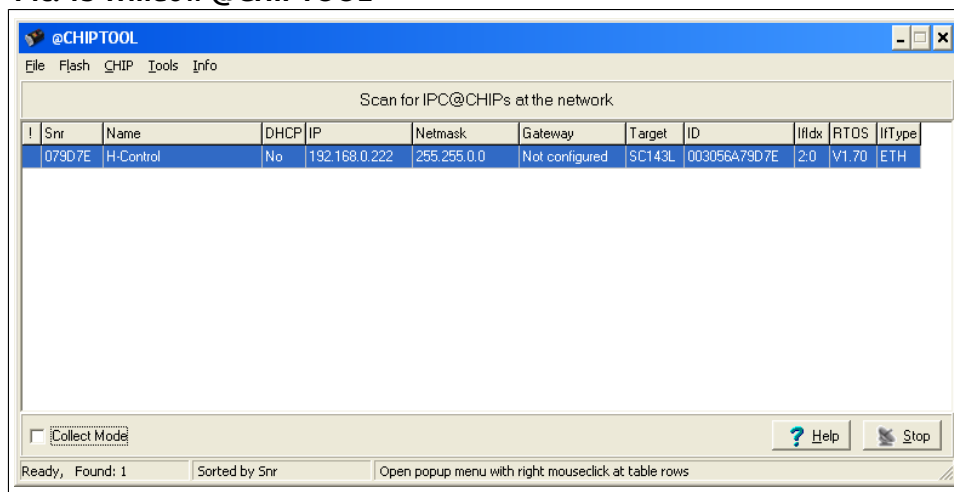
- Verify the fact communication
  Making sure the network environment is configured correctly, verify through the "ping" feature.

Pic. 1 Ping
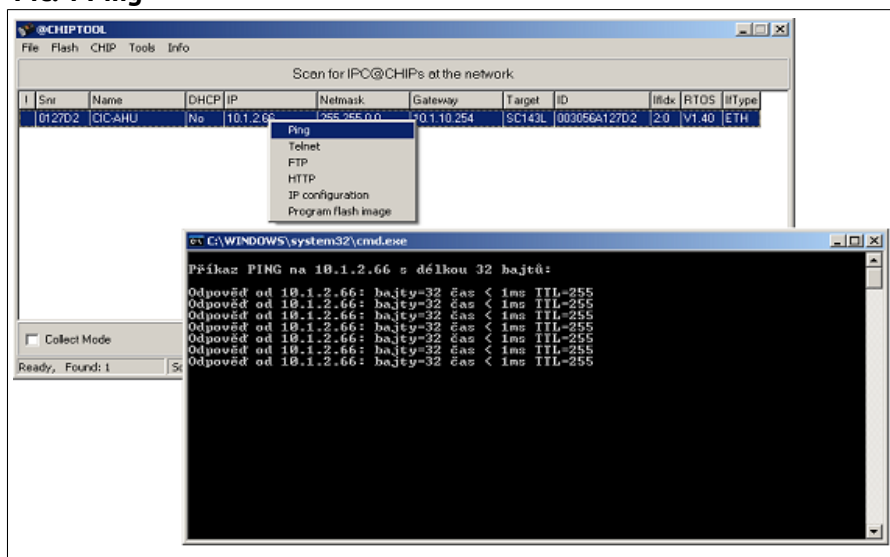
If the setting is correct, the "ping" command returns a response as shown, if not, the command returns: "Request period has expired". In this case, check the network IP address and network mask settings of your PC.

E.g., through the @CHITOOL program, I find that the controller's IP network values are: 192.168.0.100 Mask: 255.255.0.0 Gateway: no effect.

On my PC, I set the TCP/IP (version 4) protocol network communication parameters IP: 192.168.0.1 Mask: 255.255.0.0 Gateway: no effect.

I try the "ping" function again. If a response is available, I may select the "HTTP" function, which will open the default web browser, and enter the address: http://192.168.0.100

The web browser will display the main screen of the HControl measurement and control system.

- Problems with viewing the web browser
The H-Control configuration pages require Java to be installed in the Internet browser. The application (applet) is not digitally signed by a certificate, so you need to set the lowest available security level on the Java control panel or, if that is not enough, add page 192.168.x.x (the current H-Control address) to the "Exception Site List".

Pic. 16 Java control panel
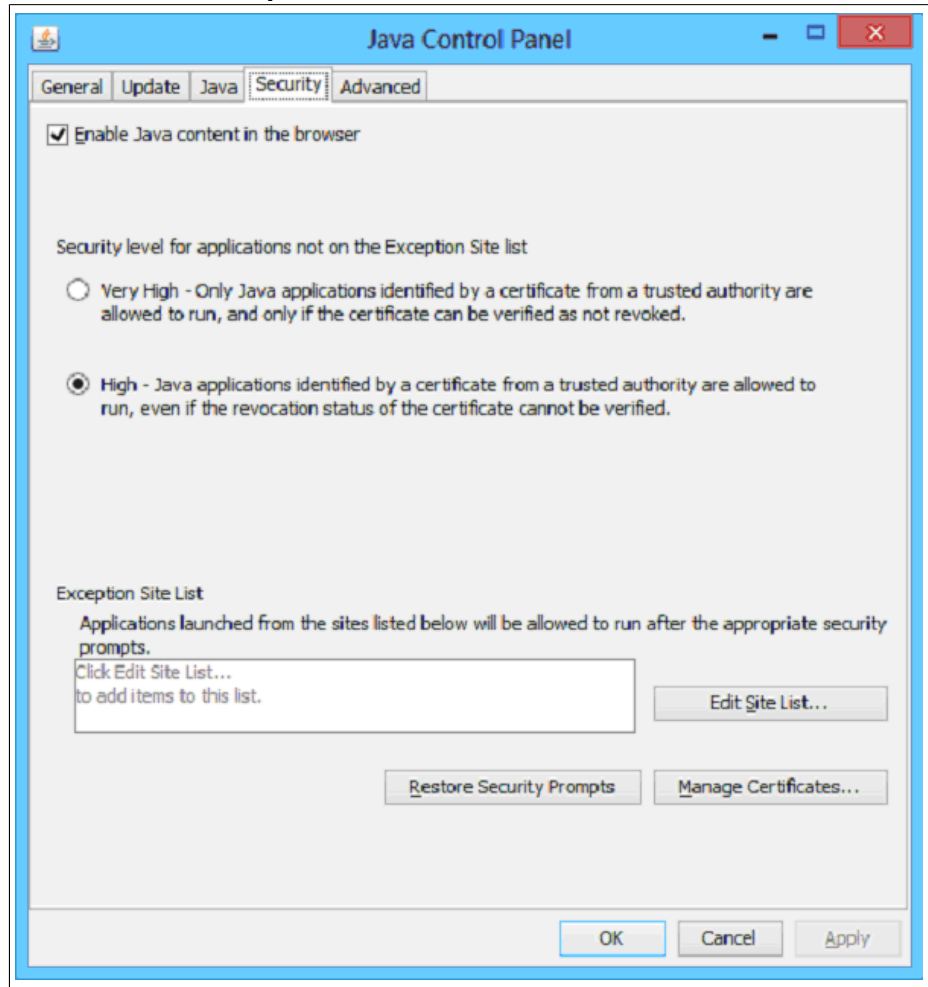
• The shape, number, and sequence of subsequent windows depend on the operating system version, selected Internet browser, and installed Java version (it is recommended to use the current version). The current version may be downloaded from http://www.java.com or found in the accompanying documentation on the enclosed CD. To gain access to H-Control, it is basically necessary to respond "Enable" and "Do not Block" to all the queries.

Pic. 17 Java warning
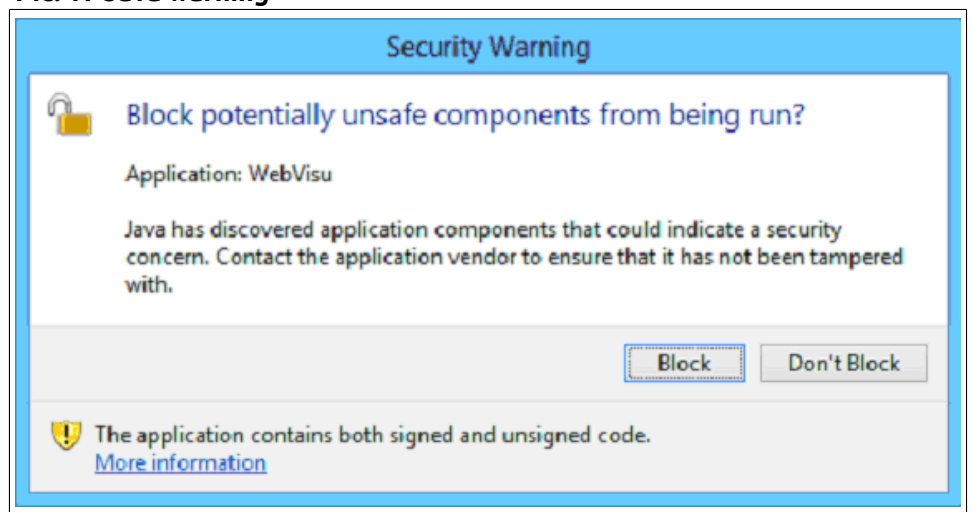
Pic. 18 Jawa warning
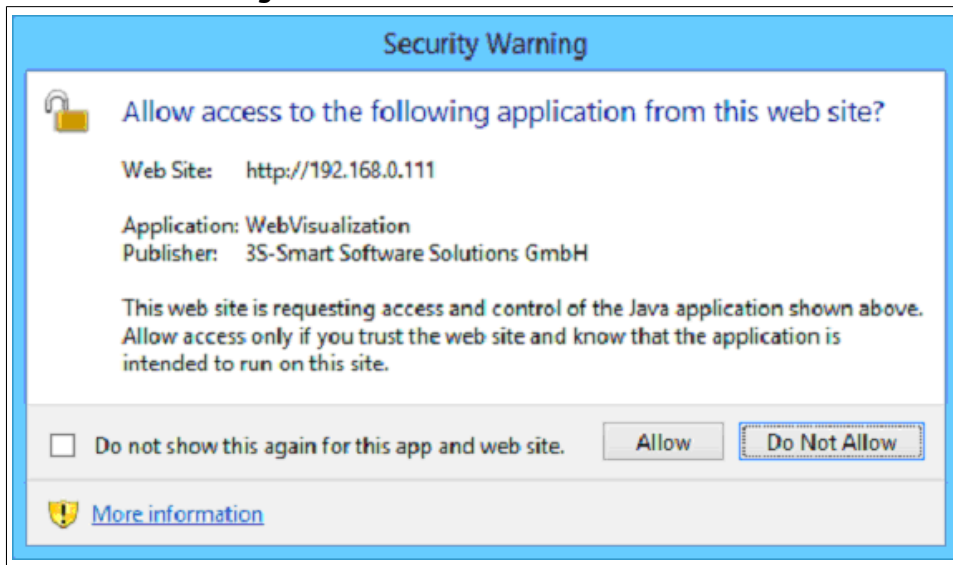
4. CONNECTION VIA THE H-VISU APP

H-Visu allows the execution of a Java applet without needing to use a web browser.

The app can be downloaded from the developer's website: http://www.cic.cz/ke-stazeni/ direct link: http://www.cic.cz/wp-content/uploads/2016/05/H-Visu.zip

Download the compressed file and unzip it in an arbitrary folder on your PC. Run the H-Visu.bat batch file and then follow the displayed instructions:

Pic. 19 Sign to H-Visu app
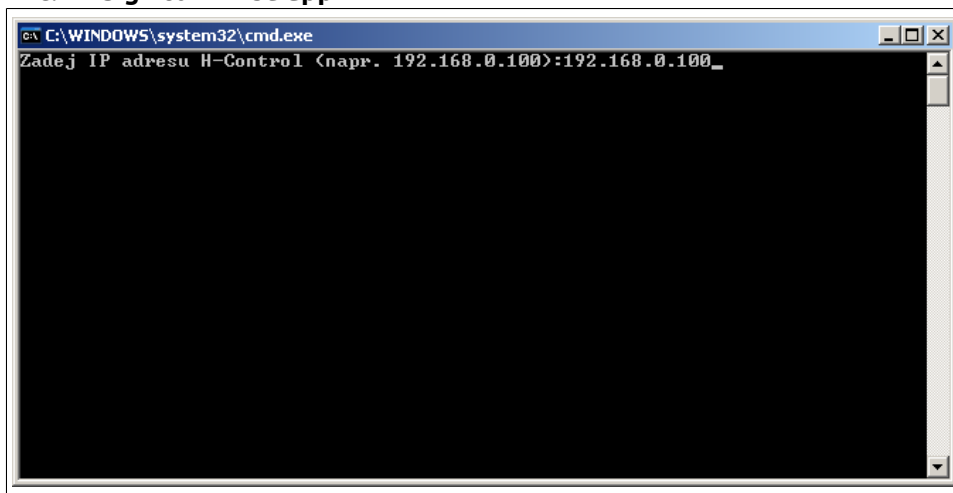
Enter the appropriate IP address of the H-Control regulator. The IP address can be obtained by using Chiptool, the default is 192.168.0.100; make sure to enter the address in its correct format and then press enter. This will launch the Java applet.

4.1 SERVICE LEVEL LOGON

If the main screen is displayed, log in to the system. Press the "login" button and log in at the required service level. In the "login" column, click on the grey field of the "new group" line and enter "1". 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).

Pic. 20 Login
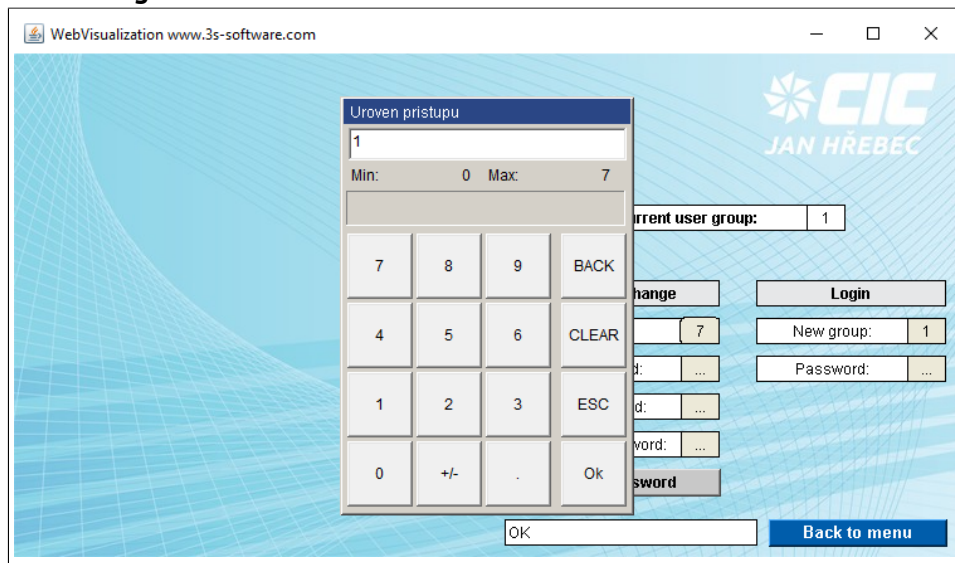
Once the login is correct, the "SERVICE" button will appear on the main screen. You may change and set all the parameters in this login mode!

Pic. 21 Main screen
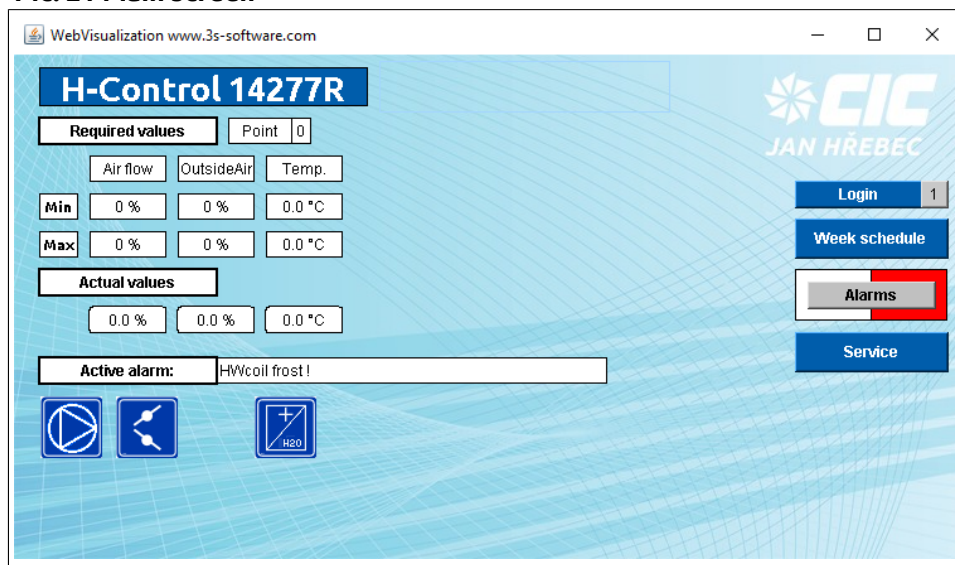
4.2 SETTING WIZARD - FINAL PARAMETERIZATION OF FREQUENCY INVERTERS

1
1 Press the "SERVICE" button and then press the "Setup Wizard" button. The following guide will be displayed:

Pic. 22 Wizard

This screen allows you to select the number and functions of the supply fan, including the controller options for constant flow/pressure. The parameters are set at the factory, and, basically, nothing needs to be set/changed in this window. Press the "Next" button.

Pic. 23 Fan section

2

This screen shows a list of actuators concerning a particular fan, providing the fan field (whose frequency inverter is not faulty and providing that the RS-485 communication is established) does not say "Alarm" in red. Press the "Parameter editing" button.

3.1

Visualization, including adjustment fields for the frequency inverter, is displayed.
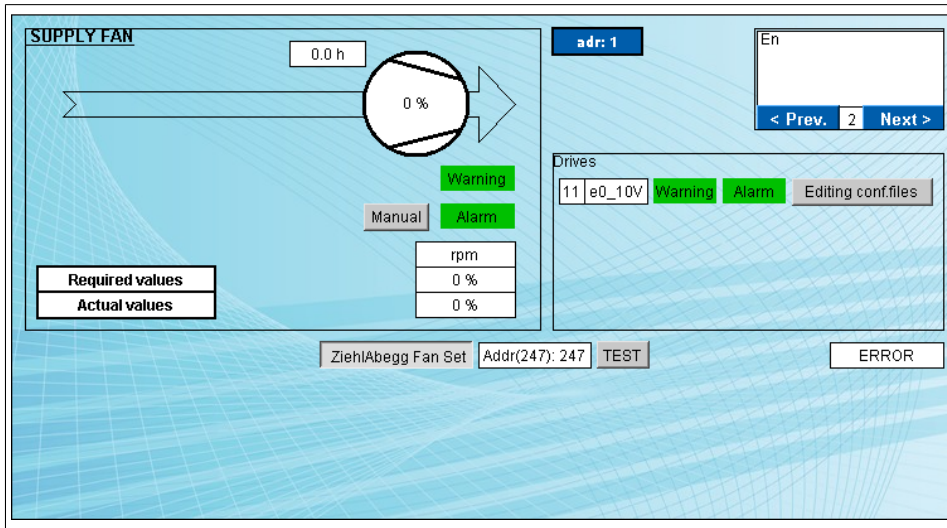
Pic. 24 Frequency inverter setting

0	DO Run	6	
1	DI NC- Failure	0	
2	DI NO- Run	0	
3	AO Duty	0	
4	Motor power [W]	3700	
5	Motor voltage[V]	230	
6	Motor frequency[Hz]	48	
7	Motor In [0.01A]	120	
8	Motor speed [1/min]	1200	
9	Motor thermistor:0/1	0	
10	Fan ramp [s]	20	
11	Fan 100% [Hz/0.01V]	60	
12	Fan lim.[Hz/0.01V]	70	
13	(ZA_PM:P11 in % Fmax	0	
14		0	
15		0	
16		0	
17		0	
18		0	
19		0	

3.2

Ziehl-Abegg fans with the AM-MOBUS communication module

The H-Control control system can communicate with Modbus modules installed in individual fans using the RS-485 bus. The bus wiring principle and bus topology are identical; see the "Switchboard Equipment" paragraph. Install the add-on AM-MODBUS communication module following the separate instructions for this module and included in the packaging. Addressing a module is performed in the visualisation window for the specific fan by pressing the "ZiehlAbegg Fan Set" button, see the addressing procedure:

1. Establish a bus connection between the PLC controller and the given communication module being configured (by disconnecting other devices from bus connection or disconnecting the power supply).
2. The communication module has a default address [247]. The module answers with "OK" after the "TEST" button is pressed. Then enter the new address into "New Addr." and enter:
   [11] for a supply fan

   [21] for an exhaust fan
3. Press "SET" to save the newly entered address. The alarm disappears if properly configured.
4. Then press "Edit parameters" and set the parameters of the newly-addressed device using the standard procedure.

Pic. 25

4

The central settings table features the preset motor data:

Table: Values for frequency inverters

Parameter	Value	Note
DO Run	Digital output number that is used to switch the given fan run request	It is not used for the RS-485 line-controlled frequency inverters.
DI	NC - Fault. The digital input number that reports a given fan failure.	It is not used for the RS-485 line-controlled frequency inverters.
DI NO- Run	Digital input number that reports a given fan run.	It is not used for the RS-485 line-controlled frequency inverters.
AO Power	Number of the analogue output that controls the given fan power.	It is not used for the RS-485 line-controlled frequency inverters.
Motor power [W]	Nominal motor power [W]. Compare the value with the actually used motor type, or correct it.	See the motor rating plate.
Motor voltage [V]	Nominal motor voltage [V]. Compare the value with the actually used motor type, or correct it.	See the motor rating plate.
Motor frequency [Hz]	Nominal motor frequency [Hz]. Compare the value with the actually used type, or correct it.	See the motor rating plate.
Motor In [0.01 A]	Nominal motor current [A]. Compare the value with the actually used type, or correct it.	Compare to the motor label for correct D/Y connection, enter the value as an integer, e.g.: 4.21 A = 421.
Motor speed [1/min]	Nominal motor speed [1/min]. Compare the value with the actually used motor type, or correct it.	See the motor rating plate.
Motor thermistor: 0/1	If a thermistor or motor thermal contact is used and connected, enter "1", otherwise, "0" – without protection.	Protection is connected to frequency inverter terminals No. 50 and 29.
Vent. ramp [s]	Fan start/stop time [s].	Value may be found on the A/C label.
Vent. 100% [Hz/0,01V]	Maximum requested value [Hz], value for 100% airflow. To control power through an analogue signal, the voltage value x 0.01 V is entered	This value may be changed during A/C air control.
Vent. lim. [Hz/0,01V]	Maximum potential fan frequency limitation [Hz]. To control power through an analogue signal, a voltage value is entered, usually 10 V.	The given fan must not exceed this value!

5

After changing the required values, press the "Save Parameters" button (meaning save them in the controller memory for later use) and then press the "Save to Inverter" button to write the selected values into the frequency inverter. For verification purposes, follow the check counter next to the "Save to Inverter" button. This counter must count to about 32 and then disappear. If the counter stops, for example, at 2 (or it stops completely at a value other than zero), it may mean:

- poorly set frequency inverter communication parameters
- incorrectly connected control bus, its termination or excessive length
- incorrectly entered parameters in the setting table, which requires exact data format (e.g.: decimal point when entering the numeric value of the motor current, incomplete or nonsensical number in the parameter input, invalid parameter character, parameter outside the instrument range, etc.)
- incorrect frequency inverter type

If the counter counts to about 32 and disappears, the frequency inverter is set.

6

Press the "Next" button and proceed to the next fan (the procedure is repeated).

7

Go through the work mode setting wizard, while setting the working modes of every working point (mode).

To the first column with 0-8 figures you may assign the required airflow values, fresh air %, temperature, and other parameters, providing the device allows you to influence these parameters.

Pic. 26 Working points

8

Press the "Next" button to proceed to the timer program setting.

Pic. 27 Weekly program
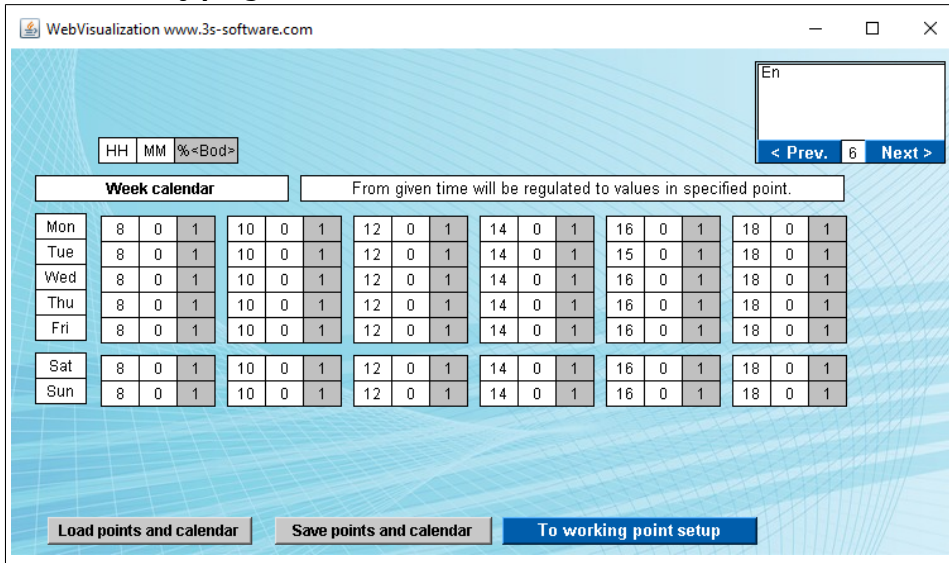
9

Press the "Next" button to proceed to the display on which the individual working modes are called up.

Pic. 28 Calling up a working point
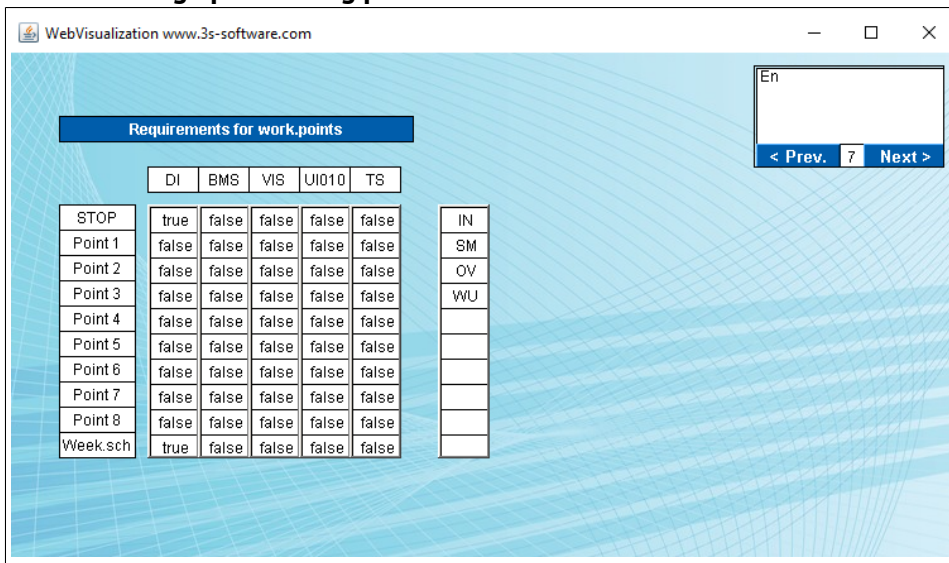
- pressing an appropriate button near the working point symbol (via a web interface, PLC buttons) = VIS
- by setting the working point on the remote controller (room) = UI010
- setting the working point through a digital input (external control) = DI
- setting from a superior system = BMS
- setting through a software thermostat = TS

10

By pressing the "Next" button, you will exit the wizard

4.3 OTHER INSPECTION STEPS

FREQUENCY INVERTER

The visual control of correct data communication operation is the synchronous flashing of the control LEDs on the drive data terminals.

FAN ROTATION DIRECTION CHECK

If you press the "Hand On" button, the frequency inverter will operate in its manual mode. Use this run mode to determine the direction of fan rotation. Press the "Hand On" button and then hold down the "Up Arrow" button to increase the inverter output frequency.

Check the direction of rotation, if it is OK, set the frequency inverter to its "AUTO/ON" mode – it will be controlled by the H-Control controller. If the motor is turning in the opposite direction, return the frequency inverter mode to "OFF/RESET", swap any two of the phase motor wires and repeat the test. If the frequency inverter reports a fault or a warning, determine the cause – see the following table:

No.	Description	Var	Fault	Blk	Fault cause
2	Working zero fault	X	X		The signal at terminal 53 or 60 is less than 50 % of the value set in par. 6-10, 6-12, and 6-22.
4	Mains phase loss	X	X	X	A phase is missing on the power supply side, or the power supply asymmetry is too high. Check the supply voltage.
7	Overvoltage in the circuit	X	X		The circuit voltage limit has been exceeded.
8	Undervoltage in the circuit	X	X		Circuit voltage dropped below the warning level due to low voltage.
9	Inverter overloaded	X	X		Over 100% load for too long.
10	ETR motor overheating	X	X		The motor is too hot due to being over 100% load for too long.
11	Motor thermistor overheating	X	X		Thermistor/thermo-contact or thermistor connection was disconnected.
12	Torque limitation		X		Torque exceeded the value set in par. 4-16 or 4-17.
13	Overcurrent	X	X	X	The peak inverter current was exceeded.
14	Ground connection		X	X	There was a lead between the output phases and ground.
16	Short-circuit		X	X	Short-circuit in the motor or motor terminals.
17	Control word time expiration	X	X		Frequency inverter does not communicate with PLC (restart PLC)
25	Brake resistor short-circuit		X	X	The brake resistor is shorted, and the brake function is, therefore, disconnected.
27	Brake resistor short-circuit		X	X	The brake resistor is shorted, and the brake function is, therefore, disconnected.
28	Brake check		X		No brake resistor is connected / it is not working.
29	Power card overheating	X	X	X	The radiator switch-off temperature has been reached.
30	Missing motor phase U		X	X	Motor phase U is missing. Check the phase.
31	Missing motor phase V		X	X	Motor phase V is missing. Check the phase.
32	Missing motor phase W		X	X	Motor phase W is missing. Check the phase.
38	Internal fault		X	X	Contact your local Danfoss dealer.
47	Control voltage error	X	X	X	The 24 V DC source may be overloaded.
51	Check AMT Unom and Inom		X		Incorrect motor voltage, current, or power setting.
52	AMT – Low Inom		X		Motor current too low. Check the settings.
59	Current Limit	X			VLT inverter overload.
63	Low value for the mechanical brake		X		The actual motor current did not exceed the "brake release" current within the "Start delay" interval.
80	The inverter was initialized to the default value		X		All the parameter settings were initialized to their default settings.

CONFIRMING THE CLOSED FILTER ELEMENT WARNING

In the list of faults, the "Clogged filter element" warning remains active. This warning is removed by pressing the "ESC" button on the H-Control in the main menu or on the web access main screen below the "ALARM" button and by pressing the "CONFIRM ALARMS" button!

AIR DAMPERS AND TEMPERATURE SENSORS CHECK

Check the function of the temperature sensors and the damper positions. For this purpose, it is advisable to use the visualization window that is available through the system's basic screen under the symbol

Pic. 29 icon

Check the correct location of the given thermometer, for example, by touching the thermometer's probe tip, and follow the increase of the given temperature in the visualization. If the unit is equipped with a hot water heater, do not forget the return heating water sensor. In addition, check the positions of the fresh air, exhaust air, mixing, and plate heat recovery actuators (if available).

4.4 OTHER SETTINGS

All the parameters may be changed in the "Param Edit" menu. A separate set of parameters is available for each A/C unit operating section. The set affects its functions. A list and description of the relevant parameters is given in the "Description of the H-Control control system parameters" document.

Pic. 30 Parameter editing

IN1 – Input parameters 1	SM – Mixing
IN2 – Input parameters 2	WK-SUP – supply fan
IN3 – Input parameters 3	WK-ETA – exhaust fan
D – Plate heat recovery	WU – Unit wakening
R – Rotary heat recovery	SHED – A/C run control
RG – Glycol heat recovery	CV – Water cooler
OV – Hot water heater	CP – Direct cooling
OE1 – Electric heater 1	CI – Inverter cooling
OE2 – Electric heater 2	CI2 – Inverter cooling 2
OG – Gas heater	ZP – Steam humidification
TC1-2 – Heat pump C.I.C.	MB_S – Modbus Slave
	UI010 – Room controler
LOCK – Service support	TS – Software thermostats

If you are not sure about changing these parameters, consult the manufacturer!

ℹ️ RESTART

After editing parameters, the changes must be saved and the controller restarted!

4.5 MANUAL TEST OF INPUTS AND OUTPUTS

To manually set the digital and analogue inputs/outputs, use the "Inputs/ Outputs" service menu, where you may manually change these values. In the

"AUTO/MANUAL" mode, you may manually override the output values and display input values.

Pic. 31 Inputs and outputs

> ⚠ **NOTICE**
>
> Do not forget to return the "AUTO/MANUAL" mode after testing!

The system is also able to correct thermometers, set PI controllers, and test the RS-485 bus.

5. RUN CONTROL

5.1 IN GENERAL

The run control priorities are as follows: the highest priority is featured by the Stop command (OFF). If the Stop command (OFF) is selected, e.g., through the web interface, remote controller, digital input, or directly via the controller buttons, it always puts the system in the OFF state and does not allow it to run if at least one Stop command (OFF) is active!

In the event that no Stop command (OFF) is required, it is possible to select the run according to a working point.

In the event of a request for a run per a working point, the system starts per this point.

In the event of a request to run according to several active working points, the system will work according to the working point with the higher assigned number (according to the web interface "Setting of working points" – higher number = higher priority).

If there is a situation where neither Run nor Stop is required, the control follows the timer program.

5.2 THROUGH WEB BROWSER

It is possible to select a run per a working point directly through a web browser by the appropriate button (next to the symbol in the "Weekly program" menu). If you are not using a web browser to permanently control the device, be sure to deactivate the run per the selected working point before disconnecting the controller from the PC!

5.3 THROUGH REMOTE (ROOM) CONTROLLER

Only 4 control modes may be selected through the remote (room) controller:

- ⏻ OFF- Stop (OFF)
- ☀ Working point 1 - Run per working point 1.
- ☾ Working point 2 - Run per working point 2.
- ☉ Timer program - Run per a timer program (if it is set)

5.4 SETTING A WORKING POINT THROUGH DIGITAL OUTPUT (EXTERNAL CONTROL)

The system run may be controlled through digital inputs. The voltage of these inputs is 24 V DC. If the device is equipped with external control terminals through its superior system, it is possible to control the run through digital inputs.

5.5 RUN MODE SETTING THROUGH THE CONTROLLER BUTTONS

If you select the "Working points" submenu on the controller, it is possible to set the modes in the same way as through the web interface.

- `Working points`
- `Current working point: X` - where X is the current working point number
- `STOP:` - stop - setting of working points, their required values, and possibility of direct working point selection and list of working points
- `BOD1:` - point No. 1
- `BOD2:` - point No. 2
- `...`
- `BOD8:` - point No. 8
- `WEEK:` - weekly program

Working point active selection shortcuts from:

- `DI` - dig. input.
- `VIS` - PLC / web display button
- `UI010` - remote controller
- `BMS` - superior system
- `TS` - software thermostat

5.6 SETTING UP THE TIMER PROGRAM

FROM THE WEB

If you require timed operations, set up the timer program correctly. For each day in a week, 6 working point changes can be carried out.

Pic. 32 Week calendar

Do not forget to save any changes in the timer program using the "Save the points and calendar"!

FROM THE REGULATOR PUSH-BUTTONS
- `Weekly program`
- `Monday:` - Monday modifications
- `Edit the first point on Monday:`
- `HOUR: 10`
- `MIN: 30`
- `POINT: 5`
- `Edit the second point on Monday:`
- `HOUR: 12`
- `MIN: 30`
- `POINT: 0`
- `...`
- `Save a day = "P"` - saves values

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

ℹ️ **NOTICE**

"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 is not ascending or the same activation times are selected for the same day, the timer program will not work!

⚠️

The manufacturer reserves the right to change the hardware and software equipment of the measurement and control system. In case of questions and uncertainties, please contact us.

6. ATTACHMENT NO.1

6.1 IC01 (PROGRAMMABLE REGULATOR C.I.C.)

Pic. 33 Internal wiring diagram