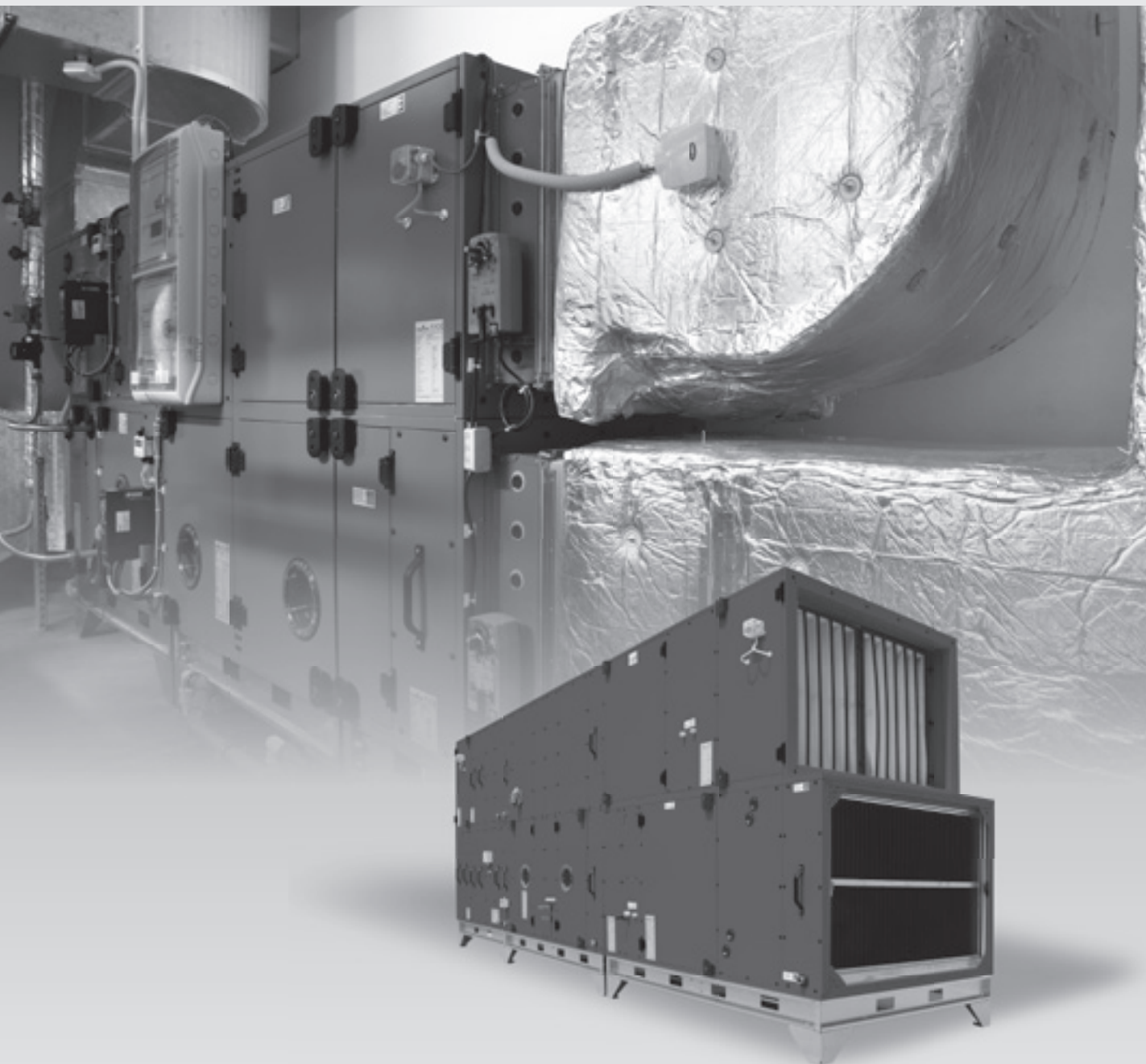


REMAK



Pool units

AEROMASTER *Cirrus / XP*

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Checking Completeness and Particulars of Installation

1. Checking Completeness and Intactness of Delivered Device

When taking over the delivery from the forwarder, it is necessary to check the completeness and intactness of the following items according to the bill of delivery:

- Completeness of air-handling unit
- Connecting material
- Accessories (siphons, etc.)
- Control unit and measuring and control components

It is essential to ensure the required preliminary work for the swimming-pool unit installation, especially the following:

- Completion of construction work in the air-handling plant
- Walling up and plastering of transport openings
- Installation of lockable doors to the air-handling plant

- Preparation of connecting points for heating system, condensate drainage and power supply
- Walling up and plastering of passages for fire dampers and air-handling duct
- Finish coatings/floor surfaces

2. Particulars of Installation and Commissioning of XP and CIRRUS Air-handling Units

Both air-handling unit ranges are equipped with a complete kit of measuring and control components, including the control unit with a power part.

To facilitate the installation of individual components and assembly of the unit, the documentation is delivered along with the corresponding pictograms..

Component	AeroMaster XP	AeroMaster CIRRUS
Air-handling damper actuators		
Actuators fitted on damper shafts	YES	YES
Cables terminated in the wiring box	YES	NO
Filter fouling sensors		
PS33N installation on the unit casing	YES	YES
Installation of pressure take-offs	YES	YES
Interconnection using polyethylene hoses	YES	YES
Settings of switching value	NO *1)	NO *1)
Pressure sensors for controlling the heat pump circuit and plate heat exchanger protection		
PS33N installation on the unit casing	YES	YES
Installation of pressure take-offs	YES	YES
Interconnection using polyethylene hoses	YES	YES
Settings of switching value	NO *2)	NO *2)
Airflow sensors		
Installation of the CPG sensor on the unit casing	YES	YES
Installation of pressure take-offs	YES	YES
Interconnection using polyethylene hoses	YES	YES
Settings of measuring range values and the fan "K" factor	YES	NO
Air temperature and humidity sensors		
Outdoor temperature sensor (without installation)	Delivery only	Delivery only
Inlet air temperature sensor (without installation)	Delivery only	Delivery only
Outlet air temperature and humidity sensor (without installation)	Delivery only	Delivery only
Fan motors		
Connection of fans to the wiring terminal boxes situated on the casing	YES	NO (without terminal boxes)
Connection of motor winding to the wiring terminal boxes	YES	NO (without terminal boxes)
Frequency Inverters	Delivery only	Delivery only
Heat pump circuits		
Temperature and pressure sensors are connected to the wiring box on the unit casing.	YES	NO
Compressors are connected to the wiring box on the unit casing.	YES	NO
The controlled injection valve is connected to the wiring box on the unit casing.	YES	NO

Installation Instructions

Air-handling unit	AeroMaster XP	AeroMaster CIRRUS
Water heater antifreeze protection		
The constant capillary air temperature sensor behind the heater is placed on the heater casing.	YES	YES
The return water temperature sensor is routed to the connecting box.	YES	NO
Heater control node		
A complete control node is included to the air-handling unit delivery. Its installation must be performed in accordance with the Installation Instructions.	Complete control node SUMX 1 ... SUMX 25	Complete Control valve with actuator and pump; Control node SUMX 28 ... SUMX 90

Note:

*1) Set the switching value to the recommended end pressure loss of the filters after starting the unit.

*2) Set the switching value according to the manufacturer's instructions – see point 6.1.1.

3. Installation Instructions

The AeroMaster XP and AeroMaster Cirrus Installation Instructions are fully valid for this unit. Instruction pictograms are provided for each associated trade profession. In the course of the installation, it is necessary to comply with all the requirements for readiness of the unit for commissioning (see the instructions under Requirements for Readiness of the Air-handling Unit for Commissioning).

3.1 "Supervision" Service

"Supervision" is a service which includes installation supervision and methodical management of the client's installation team

so that the installation results will be in accordance with "good practice" rules and REMAK regulations.

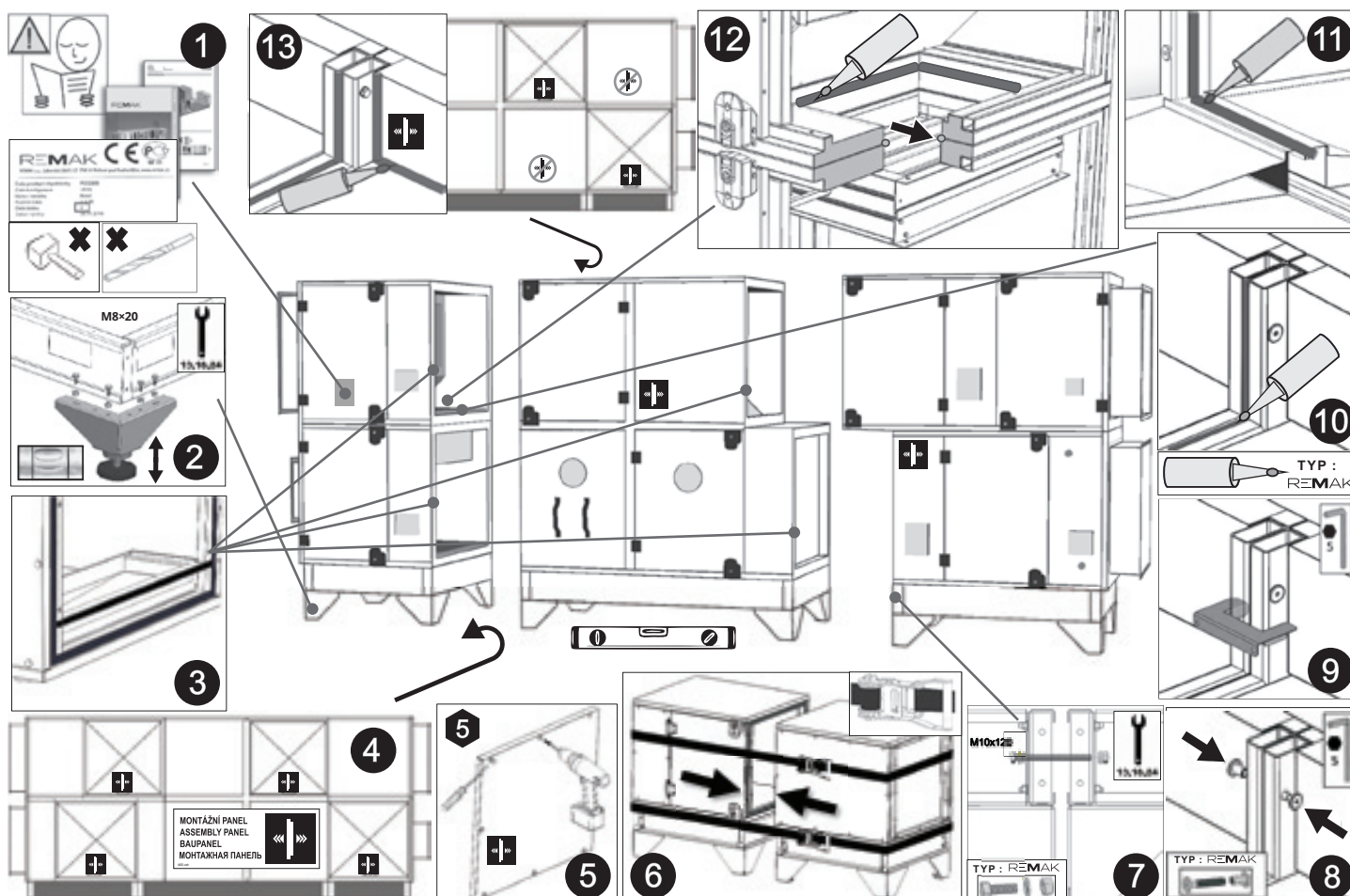
This is always a paid service.

The contracted "Supervision" service includes the REMAK technician's presence during the installation. The supervision time can be extended above the contracted range depending on the client's specific request.

3.2 Unit Assembly

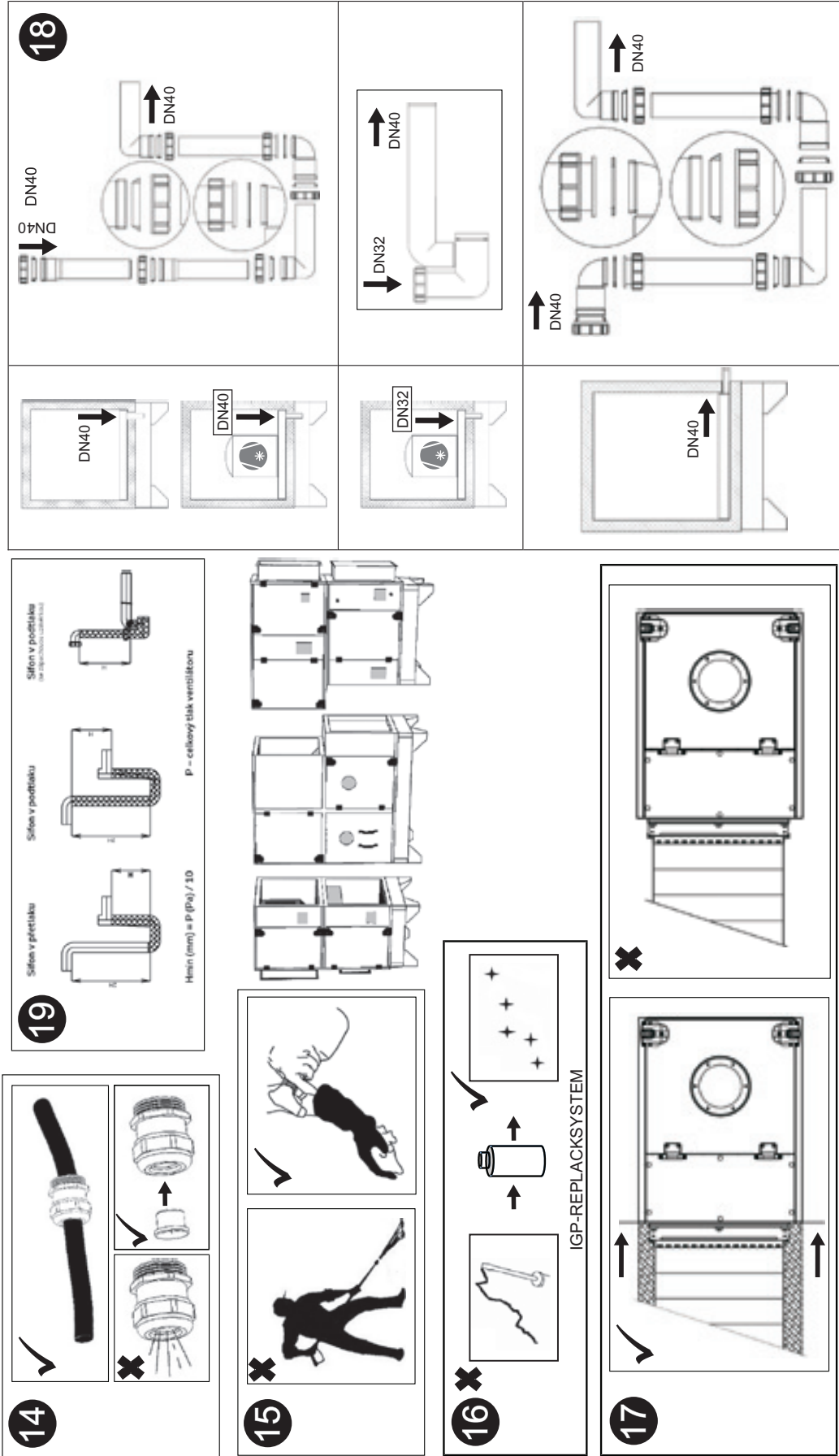
For the assembly and installation of the air-handling unit, please refer to figure 1.

Figure 1



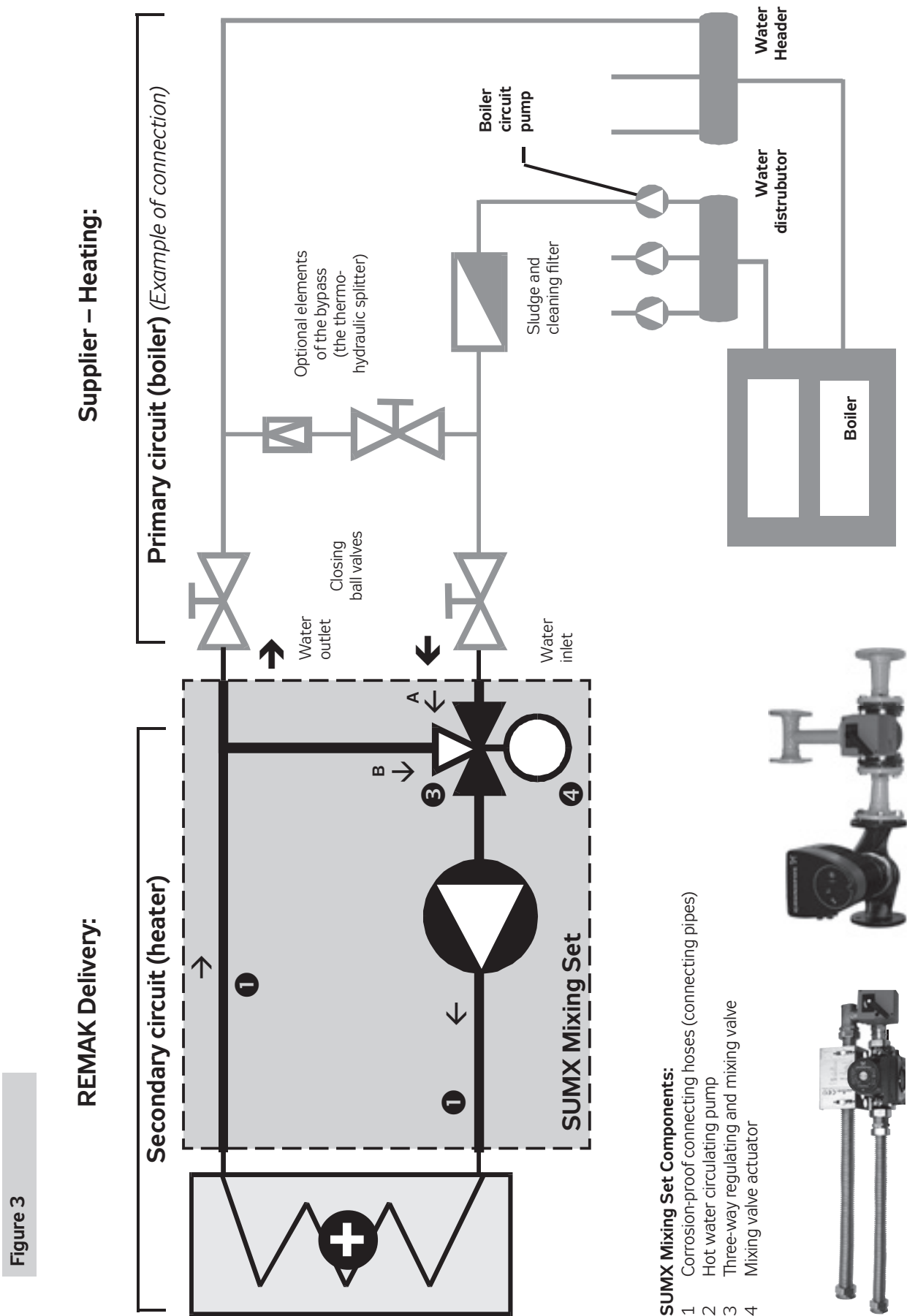
3.3 Instructions for Cleaning, Paint Repair, Air-handling Duct Insulation, Tightening of Grommets and Installation of Siphons

Figure 2



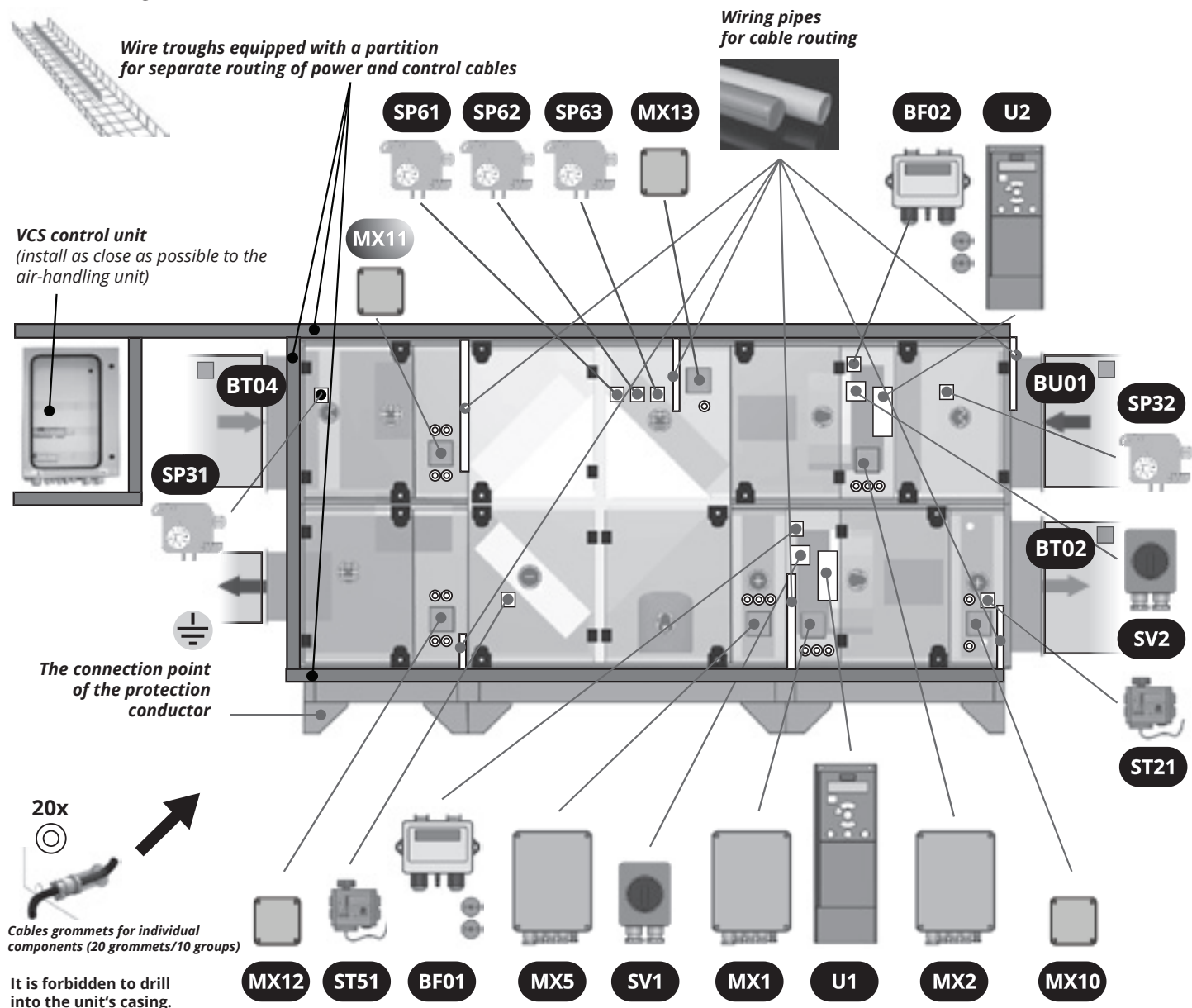
Installation Instructions

3.4 Connection of Air-handling unit to Heating System



Installation Instructions

3.5 Wiring, M&C



- | | | |
|---|---|--|
| M1 Inlet fan motor | M14 Air mixing damper actuator | SP62 Heat exchanger differential pressure sensor - medium limit |
| SV1 Inlet fan service switch | M15 Heater control valve actuator | SP63 Heat exchanger differential pressure sensor - upper limit |
| U1 M1 fan output controller | M16 Heat exchanger by-pass damper actuator | ST21 Water heater antifreeze protection |
| MX1 Technological switchboard for connection of the inlet fan motor | BU01 Air temperature and humidity sensor - outlet (air duct) | ST51 Evaporator antifreeze protection |
| M2 Outlet fan motor | BT04 Air temperature sensor - outdoor (air duct) | M12 Servopohon odtahové klapky |
| U2 M2 fan output controller | BT02 Air temperature sensor - inlet (air duct) | MX12 Connecting box for the outlet air damper actuator |
| SV2 Outlet fan service switch | BT09 Return water temperature sensor | M13 Outlet air damper actuator |
| MX2 Technological switchboard for connection of the outlet fan motor | MX10 Connecting box for the return water temperature sensor | MX13 Connecting box for air circulation damper actuator |
| M3 Circulation pump of the water heater | BT14 Swimming-pool water temperature sensor | |
| M5 Heat pump compressor | BF01 Air volume/flow sensor - inlet | |
| MX5 Technological switchboard for connection of the compressor and devices on the heat pump circuits | BF02 Air volume/flow sensor - outlet | |
| | SP31 Differential pressure sensor - filter fouling - inlet | |
| | SP32 Differential pressure sensor - filter fouling - outlet | |
| | SP61 Heat exchanger differential pressure sensor - lower limit | |
| M11 Outdoor air damper actuator | | |
| MX11 Connecting box for the outdoor air damper actuator and heat exchanger by-pass damper actuator | | |

Requirements for Readiness of the Air-handling Unit for Commissioning

4. Requirements for Readiness for Air-handling Unit Commissioning

Preliminary construction work includes a range of requirements for air-handling equipment, heating, sanitary equipment, wiring and measuring & control. All the sub-contractors of these trade professions must be acquainted with these requirements. It is necessary to pay special attention to the following points categorised according to individual professions:

4.1 Air-handling Equipment

- Connection of the air-handling unit to the heating system
- Fitting the air-handling unit with a frame on support legs and anti-vibration mountings.
- Correct sloping of the air-handling unit
- Tightening and sealing of the chamber connections
- Functionality of fire dampers
- Air-handling duct insulation
- Fitting of the end elements
- Basic settings (pre-setting) of the end elements
- Air-handling unit cleaning
- Functional forced ventilation of the air-handling plant with air-conditioned air

4.2 Heating

- Correct connection of the heater control node
- Air-venting of the piping
- Air-venting of the pump
- Air-venting of the heater
- Functionality of the shut-off valves
- Functionality of the heated water source

4.3 Sanitary Equipment

- Correct condensate drainage must be included in the project, including its construction part (hydro-insulation).
- Correct installation of siphons
- Watering of siphons
- Functional condensate drainage to gulley.

4.4 Construction

- Completion of construction work in the air-handling plant
- Completion of construction work in the ventilated room
- Safe access to the air-handling plant
- Safe access to the ventilated room
- Air-handling plant lighting

4.5 Technology

- Filling the swimming-pool with water
- Functional heat removal circuit to the swimming-pool water
- Connection to the fire prevention system, end stops of the fire dampers
- Connection of the control unit to the parent system of the remote control (SCADA, BMS, etc.).

4.6 Wiring

- Completed operating supply for the control unit
- Protection conductor interconnection
- Installation and connection of the outdoor temperature sensor
- Installation and connection of the inlet air temperature sensor
- Installation and connection of the outlet air temperature and humidity sensor

- Complete power wiring
- Complete measuring & control wiring
- Remote management connector (SCADA, BMS, etc.)

5. Air-handling Unit Commissioning

Preliminary commissioning of the air-handling unit can be carried out before putting the air-handling unit into permanent operation.

5.1 Preliminary Commissioning of Air-handling Unit

This can be carried out in cases when the preliminary work for the unit commissioning has not yet been fully completed. In these cases, Remak a.s. provides technical support and supervision services. This is always a paid service.

This is mostly required by construction contractors to be able to perform, for example, noise measurements, air-handling system regulation, building ventilation, etc.

5.2 Putting the Air-Handling Unit into Permanent Operation

After all requirements for preliminary construction works have been completed, the air-handling unit will be put into permanent operation, including training of the operating and maintenance staff at the user's site.

5.3 Commissioning of Units

Commissioning of air-handling units will be carried out upon request and once the date of commissioning has been agreed by the Remak customer service or by trained authorised service technicians.

Information about all tasks performed, achieved operating values, air flow rates, test results and the functionality of individual circuits will be continuously logged in the corresponding protocol.

5.4 Service Modes

The application software of the VCS_POOL control units has been completed with forced operating states of the air-handling unit. All installed dampers, assemblies and instruments are successively checked and adjusted in the following operating modes:

- Switched off
- "Boost" mode
- "Heat pump boost" mode
- "Air dehumidification stage 1" mode
- "Air dehumidification stage 2" mode
- "Ventilation" mode
- "Summer operation" mode
- "Cooling" mode

Preliminary Construction Work Check List

Check List

AIR-HANDLING EQUIPMENT

- CONNECTION OF THE AIR-HANDLING UNIT TO THE AIR-HANDLING SYSTEM
- POSITIONING OF THE AIR-HANDLING UNIT ON THE ANTI-VIBRATION MOUNTINGS
- CORRECT SLOPING OF THE AIR-HANDLING UNIT
- TIGHTENING AND SEALING OF THE CHAMBER CONNECTIONS
- FUNCTIONALITY OF FIRE DAMPERS
- AIR-HANDLING DUCT INSULATION
- FITTING OF END ELEMENTS
- BASIC SETTINGS (PRE-REGULATION) OF THE END ELEMENTS
- AIR-HANDLING UNIT CLEANING
- FUNCTIONAL FORCED VENTILATION WITH AIR-CONDITIONED AIR

HEATING

- CORRECT HEATER CONTROL NODE
- AIR-VENTING OF THE PIPING
- AIR-VENTING OF THE PUMP
- AIR-VENTING OF THE HEATER
- FUNCTIONALITY OF THE SHUT-OFF VALVES
- FUNCTIONALITY OF THE HEATED WATER SOURCE

SANITARY EQUIPMENT

- CORRECT INSTALLATION OF SIPHONS
- WATERING OF SIPHONS
- OPERATING CONDENSATE DRAINAGE TO GULLEY

CONSTRUCTION PART

- COMPLETION OF CONSTRUCTION WORK IN THE AIR-HANDLING PLANT
- COMPLETION OF CONSTRUCTION WORK IN THE VENTILATED ROOM
- SAFE ACCESS TO THE AIR-HANDLING PLANT
- SAFE ACCESS TO THE VENTILATED ROOM
- AIR-HANDLING PLANT LIGHTING

TECHNOLOGY

- FILLING THE SWIMMING POOL WITH WATER
- FUNCTIONAL HEAT REMOVAL CIRCUIT TO THE SWIMMING-POOL WATER
- CONNECTION TO THE FIRE PREVENTION SYSTEM
- CONNECTION TO THE BMS, SCADA

WIRING

- COMPLETED OPERATING SUPPLY FOR THE CONTROL UNIT
- PROTECTION CONDUCTOR INTERCONNECTION
- INSTALLATION AND CONNECTION OF THE OUTDOOR TEMPERATURE SENSOR
- INSTALLATION AND CONNECTION OF THE INLET AIR TEMPERATURE SENSOR
- INSTALLATION AND CONNECTION OF THE OUTLET AIR TEMP. AND HUM. SENSOR
- COMPLETE POWER WIRING
- COMPLETE MEASURING & CONTROL WIRING
- REMOTE MANAGEMENT CONNECTOR (SCADA, BMS)



ITEMS MARKED WITH (*) ARE MANDATORY FOR PRELIMINARY COMMISSIONING

- * ☐ YES/NO
- * ☐ YES/NO
- * ☐ YES/NO
- * ☐ YES/NO
- * ☐ YES/NO
- ☐ YES/NO
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- * ☐ YES/NO
- ☐ YES/NO

Troubleshooting

5.5. Troubleshooting

When commissioning the air-handling unit, it is sometimes necessary to remove errors in connections of instruments. To identify problems, use the following table of the most common failure states:

Fault reporting	The operational status of the unit	A possible cause of the fault condition	The removal of the fault condition
SupplyTmpSnsr	The unit is turned off	1) Faulty temperature sensor inlet	Exchange temperature sensor
		2) Faulty connection in the terminals	Fix the connections
		3) Defective cable to the sensor	Replacement cable
RoomTmpSnsr	The unit is in operation If the air temperature sensor in the exhaust pipe fails, the unit automatically switches from the air temperature control to the supply air temperature control. Humidity control does not work.	1) Faulty temperature sensor room	Exchange sensor temperature and humidity
		2) Faulty connection in the terminals	Fix the connections
		3) Defective cable to the sensor	Replacement cable
RoomHumSnsr	The unit is in operation	1) Faulty sensor the humidity of the air in the ventilated air	Exchange sensor temperature and humidity
	Dysfunctional regulation of the humidity of the air	2) Faulty connection in the terminals	Fix the connections
		3) Defective cable to the sensor	Replacement cable
OutTmpSnsr	The unit is in operation	1) Faulty sensor of outdoor temperature	Exchange temperature sensor
	Dysfunctional regulation of the humidity of the air	2) Faulty connection in the terminals	Fix the connections
		3) Defective cable to the sensor	Replacement cable
HtgFrstTmpSnsr	The unit is turned off	1) The low temperature of the heating water	Check the supply of heating water
		2) Failure of the circulation pump of the heater	Check the pump operation
		3) A faulty temperature sensor return water	Exchange temperature sensor
		4) Faulty connection in the terminals	Fix the connections
		5) Defective cable to the sensor	Replacement cable
Fan	The unit is turned off	1) Thermal protection of the motor windings	Check thermal protection of the motor windings
		2) Frequency innverter	Identify the type of inverter failure. Remove the cause of the disorder and erase the error message both in the inverter and the control unit.
		3) Failure of the MODBUS communication	Remove the cause of the disorder
WaterHeatingPump	The unit is in operation	1) Turned Off the circuit breaker of the pump	Turn on the circuit breaker
		2) Failure of the circulation pump of the heater	To fix the pump
Heat pump	The unit is in operation	3) Failure of heat pump	Identify the malfunction on the module FREE
	Heat pump off		Remove the cause of the disorder
Filter	The unit is in operation	1) Entered in the filters (dirty)	Replace the filter element
		2) Fault sensor clogged filter	Fix the mechanics of pressure Replace the faulty sensor PS33
Supply fan - flow	The unit is turned off	1) Failure of the sensor air flow UNICON	Check the function of the device Check the settings of the device
		2) Clogged / faulty sampling of the air pressure	Fix the mechanics of pressure
Exhaust fan - flow	The unit is turned off	1) Failure of the sensor air flow UNICON	Check the function of the device Check the settings of the device
		2) Clogged / faulty sampling of the air pressure	Fix the mechanics of pressure
Fire	The unit is turned off	1) Closed fire damper	Check dampers
		2) Open circuit off of the unit	Check the circuit

6. Documentation

6.1 Instrument Installation and Setting Instructions

6.1.1 Settings of Sensors on the Plate Heat Exchanger

The assembly of the air-handling unit, plate heat exchanger and heat pump is as standard equipped with three sensors:

- SP61** Heat exchanger differential pressure sensor - lower limit
- SP62** Heat exchanger differential pressure sensor - medium limit
- SP63** Heat Exchanger Differential Pressure Sensor - Upper Limit

Operation of the heat pump is enabled in the following states of differential pressure sensors on the plate heat exchanger (DEV):

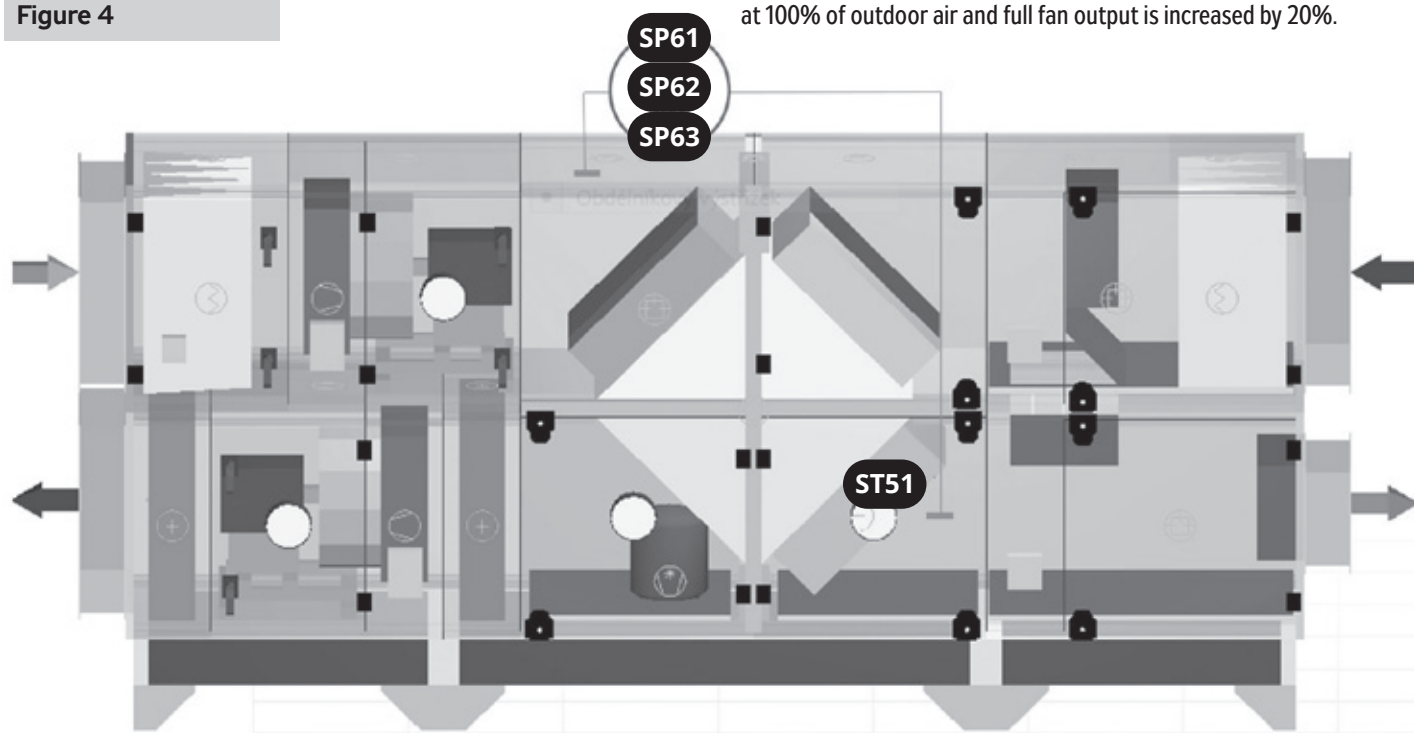
Sensor - lower limit:	OFF	ON	ON	OFF
Sensor - medium limit:	OFF	OFF	ON	ON
Heat Pump:	Limited	Switched ON	Limited	Limited

The upper limit works as active antifreeze protection of the heat exchanger.

Settings of the pressure sensor values according to the measured pressure losses (during air-handling unit commissioning):

- SP61** 30Pa
- SP62** Pressure loss of the plate heat exchanger (when the heat exchanger damper is opened) and evaporator at 100% of outdoor air and full fan output is increased by 10%.
- SP63** Pressure loss of the plate heat exchanger and evaporator at 100% of outdoor air and full fan output is increased by 20%.

Figure 4



6.1.2 Installation of Capillary Tube behind the Evaporator

The assembly of the air-handling unit, plate heat exchanger and heat pump is as standard equipped with protection of the evaporator - the CAP3 capillary thermostat. Using the standard holders, the capillary tube is wound on the evaporator in the direction of the air outlet from the unit. Place the capillary thermostat on the outside of the unit.

Operation of the pump is enabled when the thermostat is closed.

6.2 Protocols

- Request for commissioning of the air-handling unit (a part of the Contract of Sale)
- Preliminary commissioning protocol (available for authorised persons)
- Air-handling unit commissioning protocol (available for authorised persons)
- Operating staff training protocol (available for authorised persons)

6.3 Operating Instructions

- VCS POOL Control Unit Operating Instructions
- Unicon/Unicon CPG Operating Instructions
- FM VLT FC 51 Operating Instructions, Frequency Inverter Operation and Setting
- FM VLT Danfoss FC 101 Operating Instructions, Frequency Inverter Operation/Setting
- FM VLT Danfoss FC 102 Operating Instructions, Frequency Inverter Operation/Setting
- Compressor Unit Installation, Operating and Maintenance Instructions
- Heat Pump Circuit Regulator Operating Instructions
- JDK Operating Instructions.



Warning

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 Always observe local laws and regulations.

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