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**Air handling unit "Aeromaster"**

Sales Order Number: (PO / OD):

Type and size:

*For example XP 06; Cirrus 84*

Position:

The serial number of the control unit:

*If Remak control (VCS) is not used, fill in "without VCS control"*

Designation of HVAC equipment according to specifications (by the execution):

Name of contract:

# Air handling unit with fan power control for constant airflow

**Commissioning** ☐ **Operating service** ☐

*Check the box to indicate the type of work to be performed*

## 1. Connection of main electrical supply, phasing, control of main switch

Cable:

Fusing:

Connected from switchboard:

| | | Yes / No |
|---|---|---|
| Check the power switch function | Without defects | |

## 2. Checking the connection of the HMI control module to the controller

| | | |
|---|---|---|
| | Without defects | |

## 3. Checking input circuit functions, temperature measurement, Modbus communication

| | | |
|---|---|---|
| Temperature measurment | Without defects | |

With the HMI-SG press the button ✓, scroll through "+" "-" buttons, press to end

| | | |
|---|---|---|
| Digital inputs | Without defects | |
| Modbus communication | Without defects | |

## 4. Connect the air handling unit heater

Outdoor temperature at the time of execution of works: °C

### 4.1. Hot water heater

Heating water parameters: (actual when commissioning) °C

Operating pressure of heating system: kPa

| | | Yes / No |
|---|---|---|
| Valve actuator connection at SUMX | | |
| Connection of circulation pump in SUMX | | |
| Bleeding the heater | Done | |
| Bleeding the circulating pump | Done | |

### 4.2. Electric heater

Power: kW

Fusing: A

Working current: A

Electric heater control mode:

Switching the section ☐ PWM ☐ ON / OFF ☐

## 5. Inspection of flexible cuffs for air duct connection

| | | Yes / No |
|---|---|---|
| | Done | |

## 6. Check the seal of the service panels and doors of the unit chambers

| | | Yes / No |
|---|---|---|
| | Done | |

**7.Checking the fan chambers**

| Frekquency inverters | | EC motors | |
|---|---|---|---|

| | | Yes / No |
|---|---|---|
| Check mechanical assembly of the fan supply air, silentblocks check | Without defects | |
| Check mechanical assembly of the fan exhaust air, silentblocks check | Without defects | |

Air supply fan

Power…….W, 50Hz, Voltage…….V, Speed ……/min, Current…..A

*Fill in the data read from the motor nameplate*

Impeller diameter…… .mm; "K" factor …….; Measuring range …….. Pa

*Fill in the data read from the fan nameplate*

Fill in the following data only when controlling the fans with frequency inverters:

| | | | Yes / No |
|---|---|---|---|
| Check the Modbus signal control settings | Parameter 8-01=2 | Set | |
| | Parameter 8-02=1 | Set | |
| | Parameter 8-30=2 | Set | |

Working Frequency: ____ Hz

Communication address:

| | | Yes / No |
|---|---|---|
| Parameter 8-31=1 | Set | |

Communication address of the second fan (for Cirruss units):

| | | Yes / No |
|---|---|---|
| Parameter 8-31=2 | Set | |

Minimum Frequency: 20 Hz

Ramp run up time: Parameter 3-41: …… sec

Maximum Frequency: ____ Hz

Ramp run down time: Parameter 3-42: …… sec

Air exhaust fan

Power…….W, 50Hz, Voltage…….V, Speed ……/min, Current…..A

*Fill in the data read from the motor nameplate*

Impeller diameter…… .mm; "K" factor …….; Measuring range …….. Pa

*Fill in the data read from the fan nameplate*

Fill in the following data only when controlling the fans with frequency inverters:

| | | | Yes / No |
|---|---|---|---|
| Check the Modbus signal control settings | Parameter 8-01=2 | Set | |
| | Parameter 8-02=1 | Set | |
| | Parameter 8-30=2 | Set | |

Working Frequency: ____ Hz

Communication address:

| | | Yes / No |
|---|---|---|
| Parameter 8-31=5 | Set | |

Communication address of the second fan (for Cirruss units):

| | | Yes / No |
|---|---|---|
| Parameter 8-31=6 | Set | |

Minimum Frequency: 20 Hz

Ramp run up time: Parameter 3-41: …… sec

Maximum Frequency: ____ Hz

Ramp run down time: Parameter 3-42: …… sec

**8. Setting parameters for constant air flow control**

**8.1. Unicon flow controllers**

| | Supply | | Exhaust | |
|---|---|---|---|---|
| Base Setup | **Mode 5.00** | | **Mode 5.00** | |
| Measuring Range | | $m^3$ / hr | | $m^3$ / hr |
| K - factor | | | | |
| Offset (Sensor alignment) | 0 | $m^3$ / hr | 0 | $m^3$ / hr |
| In PLC parameter: | | $m^3$ / hr | | $m^3$ / hr |

After entering the mode, measuring range and "K" factor, the flow controller calculates the air flow parameter.

**8.2. Setting the air flow control parameters in the controller**

8.2.1. Setting parrametres using HMI-TM, DM module:

After logging in "MENU": Settings / Fans / Flow Control (Pressure) to set the desired value.

| RegulFans-Flow(Press) | 2/5 | | |
|---|---|---|---|
| SypplyFlowRangeSnsr…….. | 8810 | $m^3$ / hr | |
| ReturnFlowRangeSnsr…….. | 8810 | $m^3$ / hr | |
| NmbrOfSplyFans | 1 | | 1 |
| NmbrOfRtrnFans | 1 | | 1 |
| Enable - k Factor | No | | No |

Supply Air Flow Sensor Range: Set the Unicon sensor value

Exhaust Air Flow Sensor Range: Set

8.2.2. Setting parrametres using HMI-SG module:

The following data points apply to the HMI-SG settings:

| **Control - Air Flow** | | | **Data point** |
|---|---|---|---|
| Setting the flow sensor range - supply | | $m^3$/Hr | 222 |
| Setting the flow sensor range - exhaust | | $m^3$/Hr | 224 |
| "K" factor supply | | | 232 |
| "K" factor exhaust | | | 234 |
| Number of supply fans | | | 236 |
| Number of exhaust fans | | | 238 |
| Enable"k" factor (0=No; 1=Yes) | | | 240 |

**8.3. Setting the power stages of the fans**

The 70% / 85% / 100% of the unit's rated airflow rate is usually suitable for setting the individual power stages.
The "Supply / Exhaust" setting ratio must be adjusted according to the air conditioning so that a slight vacuum is provided in the ventilated space.The "Inlet / Draw" setting ratio must be adjusted according to the air conditioning so that a slight vacuum is provided in the ventilated space.
We set the adjustment from level 5 to grade 1.

8.3.1. Setting parrametres using HMI-TM, DM module:

In the "MENU": Settings / fan / **supply-exhaust fan**, we configure the desired values.

| Fans | |
|---|---|
| RegulFans-Flow(Press) | |
| Fan supply output | |
| Fan exhaust output | |
| BlckHighSpeedFan | -60°C |
| DelayStartFan | 45s |
| FlowActDelayStrtErr | 5s |
| TherContActDelayErr | 2s |
| DelayInverterErr | 2s |

| Power Supply Fan | | |
|---|---|---|
| 1. Stage | 2720 | $m^3$ / Hr |
| 2. Stage | 3740 | $m^3$ / Hr |
| 3. Stage | 4760 | $m^3$ / Hr |
| 4. Stage | 5780 | $m^3$ / Hr |
| 5. Stage | 6800 | $m^3$ / Hr |

| Power Exhaust Fan | | |
|---|---|---|
| 1. Stage | 2 584 | $m^3$ / Hr |
| 2. Stage | 3 230 | $m^3$ / Hr |
| 3. Stage | 4 522 | $m^3$ / Hr |
| 4. Stage | 5 491 | $m^3$ / Hr |
| 5. Stage | 6 460 | $m^3$ / Hr |

8.2.2. Setting parrametres using HMI-SG module:

The following data points apply to the HMI-SG settings:

| **Power supply fan** | | | **Data point** | **Power exhaust fan** | | **Data point** |
|---|---|---|---|---|---|---|
| 1st stage | | $m^3$/hr | 141 | | $m^3$/hr | 151 |
| 2nd stage | | $m^3$/hr | 143 | | $m^3$/hr | 153 |
| 3rd stage | | $m^3$/hr | 145 | | $m^3$/hr | 155 |
| 4th stage | | $m^3$/hr | 147 | | $m^3$/hr | 157 |
| 5th stage | | $m^3$/hr | 149 | | $m^3$/hr | 159 |

**9. The Direction of Rotation of Fans**

Yes / No

Set

**Should be taken of the increase of caution.**

**Attention to the open fan of the chamber!!! Fan leave only divaricate, not get off the ground at full power!!!**

Use the local HMI to perform a short start of the unit:

**HMI-TM,DM: Main Menu / Settings / Manual Mode / Comfort St.1.; HMI-SG: Briefly press button T1**

| Supply fan | | Exhaust fan | |
|---|---|---|---|

*Check the correct direction of rotation of the impeller by confirming "Correct" in the appropriate box*

After the check, switch off the unit:

**HMI-TM, DM: Main menu / settings / manual mode / STOP; HMI-SG: Briefly press button T1**

**10. Checking the rotary heat exchanger, setting the parameters for controlling the heat exchanger motor.**

This check is performed when the rotary heat exchanger is integrated into the air handling unit assembly.

Yes / No

| | | |
|---|---|---|
| Checking the mechanical assembly and connection to the relevant chambers | Without defects | |
| Checking the tilt indicator | Without defects | |
| Checking the mechanical bearing and rotation of the heat exchanger exchanger | Without defects | |
| Checking the heat exchanger drive belt | Without defects | |

Check the setting frequency inverter and the drive function of the heat exchanger

Transmission drive: Power.....W, 50Hz, Voltage.....V, Speed ...../min, Current.....A

*Fill in the data read from the motor nameplate*

Yes / No

| | | | |
|---|---|---|---|
| Check the Modbus signal control settings | Parameter 8-01=2 | Set | |
| | Parameter 8-02=1 | Set | |
| | Parameter 8-30=2 | Set | |
| Working Frequency: ____ Hz | Communication address: | Set | |
| *Depending on the gearbox used, 50Hz or 85Hz* | Parameter 8-31=11 | | |

| | | | | |
|---|---|---|---|---|
| | | | | Yes / No |
| | | | Set | |
| Minimum Frequency: | 18 | Hz | Ramp run up time | Parameter 3-41: 30 sec |
| | | | | Yes / No |
| | | | Set | |
| Maximum Frequency: | | Hz | Ramp run up time | Parameter 3-42: 30 sec |

*Depending on the gearbox used, 50Hz or 85Hz*

**11. Checking and adjusting the unit:**

**11.1- Off** Unit turn Off from HMI: Data point HMI-SG: 125=1

| Achieved statues | | | Unit Off | Check |
|---|---|---|---|---|
| o | Air supply damper | Closed | 0% | |
| o | Air exhaust damper | Closed | 0% | |
| o | Air mixing damper | Open | 100% | |
| o | The damper of By-Passing the recuperator | Open | 100% | |
| | common shaft (the opposite direction) | Closed | 0% | |
| o | Heater circulation pump | Current state: | * 1) | |
| o | Electric heater | Off | 0% | |
| o | Control valve heating | Current state: | * 1) | |
| o | Integrated cooling Heat pump | Off | 0% | |
| o | Fans | Off | 0% | |

* 1) Circulation heater pump and SUMX control valve position automatically controlled by active frost protection

Yes / No

**11.2 The direction of rotation of compressors** Done

In the control unit, activate the cooling circuit / heat pump.

| | | | |
|---|---|---|---|
| Compressor 1 | | Compressor 2 | |

*Check the correct operation of the compressor confirm record "correctly" in the appropriate box*

**12. PLC Parameterization for a given application.**

**12.1. Damper adjustment with activated air mixing function**

Yes / No

Main menu/Settings/Control Parameters/Sequence/Mixing Set

| Mixing | 1/8 |
|---|---|
| MinFreshAir | 55% |
| MixDampTempFullOp | 15,0°C |
| MixDampTmFullOp | 60s |
| ValueOfMixing | 60% |

**Set value:**

| | | Data point |
|---|---|---|
| Minimum fresh air: | ..... % | 484 |
| Opening temperature setting: | ..... °C | 486 |
| The activation time opening: | ..... sec | 488 |

Yes / No

**12.2. Setting limit for supply air temperature:** Set

| | | | Data point |
|---|---|---|---|
| Minimum supply air temperature | | °C | 194 |
| Maximum exhaust air temperature | | °C | 195 |
| Maximum deviation between room and inlet air temperature | | °C | 121 |
| Minimum deviation between room and inlet air temperature | | °C | 123 |

Yes / No

**12.3. Enable air cooling circuit, heat pump operation** | Set |

**Blocking from the outside temperature:**

Data point

| | | | |
|---|---|---|---|
| Temperature for heating mode: | | °C | 365 |
| Temperature for cooling mode: | | °C | 378 |

**12.4 Set the time schedules**

Yes / No

Set the schedules according to user requirements | Set |

**12.5 Set the required temperature:**

Yes / No

Set

| Operation mode | | Temperature | HMI-SG data point |
|---|---|---|---|
| Full operatin "Comfort" | Heating | °C | 103 |
| Full operation "Comfort" | Cooling | °C | 101 |
| Mufled operation "Economic" | Heating | °C | 107 |
| Mufled operation "Economic" | Cooling | °C | 105 |

**12.6 Set the required humidity:**

Yes / No

Set

| Operation mode | Humidity | HMI-SG data point |
|---|---|---|
| Full operatin "Comfort" | % | 531 |
| Mufled operation "Economic" | % | 535 |

Yes / No

**13. Set the filter clogging sensors:** | Set |

| | | | | | |
|---|---|---|---|---|---|
| Air supply (1st stage of | Pa | Air supply (2nd stage of filtration) | Pa | Exhaust air | Pa |

**14. Other settings made:**

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**15. Checking the protection circuits of the unit**

Yes / No

| | |
|---|---|
| Frost protection of the water heater / protection of the electric heater | Without defects |
| Low pressure circuit protection of the heat pump / cooling | Without defects |
| High pressure circuit protection of the heat pump / cooling | Without defects |
| Circuit protection winding motor supply fan | Without defects |
| Circuit protection winding motor exhaust fan | Without defects |

Yes / No

**16. Test operation of the unit in "Comfort" and "Economy" modes** Done

**Prior to the start of these work, it is necessary to check clearing the chambers, to close all the service panels!**

To check the operation of the unit, switch the "Comfort" / "Economy" mode and set the fan power in stages 1, 2, 3, 4, 5.

Yes / No

**17. Testing the operation of the unit in the "Auto" mode** Done

Air supply fan

Parameters read in the control unit

Fan speed: Stage: | Air flow $m^3$/hod | % of power signal in VCS

Parameters read in the frequency inverter

Frequency / Hz | Power / W | Current / A

Air exhaust fan

Parameters read in the control unit

Fan speed: Stage: | Air flow $m^3$/hod | % of power signal in VCS

Parameters read in the frequency inverter

Frequency / Hz | Power / W | Current / A

Achieved parametres of the microclimate of the ventilated space

Air temperature in the room (in the exhaust duct) °C

Air humidity in the room (in the exhaust duct) %

Yes / No

| | |
|---|---|
| Check of the switching unit operation according to schedule | Without defects |
| Compliance with the limit set air temperature | Without defects |
| Verify the correct function of the additional function for VCS | Without defects |
| Switch off the unit by "Fire" signal | Without defects |
| Switch off the unit by remote control | Without defects |

Yes / No

**18. Check the integrated cooling circuit, the heat pump circuit** Without defects

**Aggregat:** **Type of complette aggregate:**

Serial number: .....

**Heat pump / cooling circuit operation**

Low refrigerant pressure Bar | High refrigerant pressure Bar

**Compressor 1**

Indicate the type of compressor installed

Working current compressor A

**Compressor 2**

Indicate the type of compressor installed

Working current compressor A

The amount of refrigeration kg | Used refrigerant

| | Yes / No |
|---|---|
| Checking functions injection valve Refrigerants: Functional | |

**Additional information on cooling circuits, condensing units, etc.:**

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**19. Check the condensate drain function from the unit**

| | | Yes / No | Note / Comment: |
|---|---|---|---|
| Installation of siphons | Without deffects | | ..... |
| Filling siphons with water | Without deffects | | ..... |
| Proper function of siphons | Without deffects | | |

**20. Notes technician**

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**21. Next steps / planned repairs**

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**22. Client's statement / comments**

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**Work performed** **Date** **The deliveries and work took over:**

..... ..... ..... .....