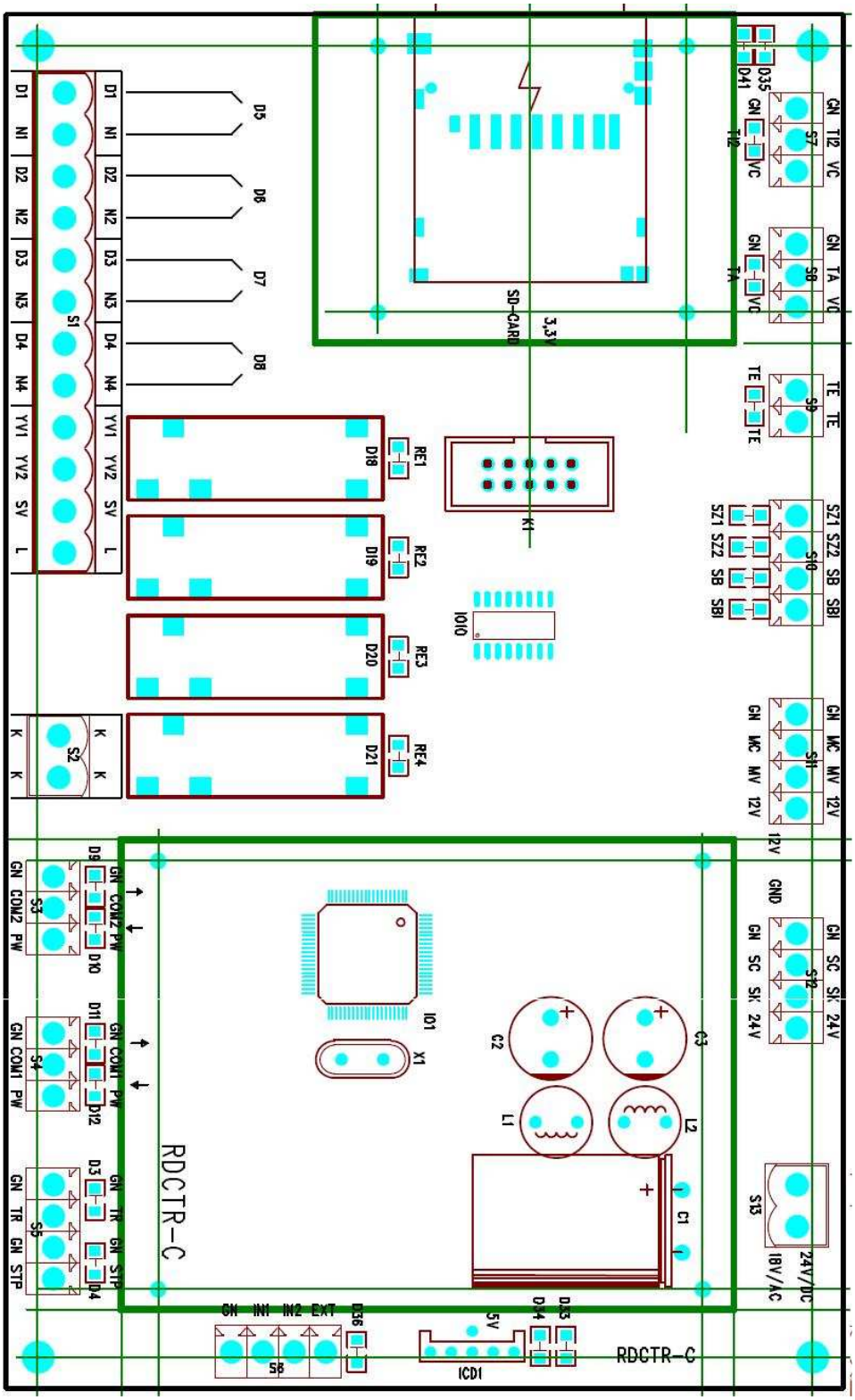
1 Contents

2 RD-CTR control board

The RD-CTR control board is used for controlling DUPLEX RD and EC series HVAC units. The RD-CTR board features an input and output range to provide for the basic HVAC functions of both basic types of heaters.

2.1 RD-CTR board diagram

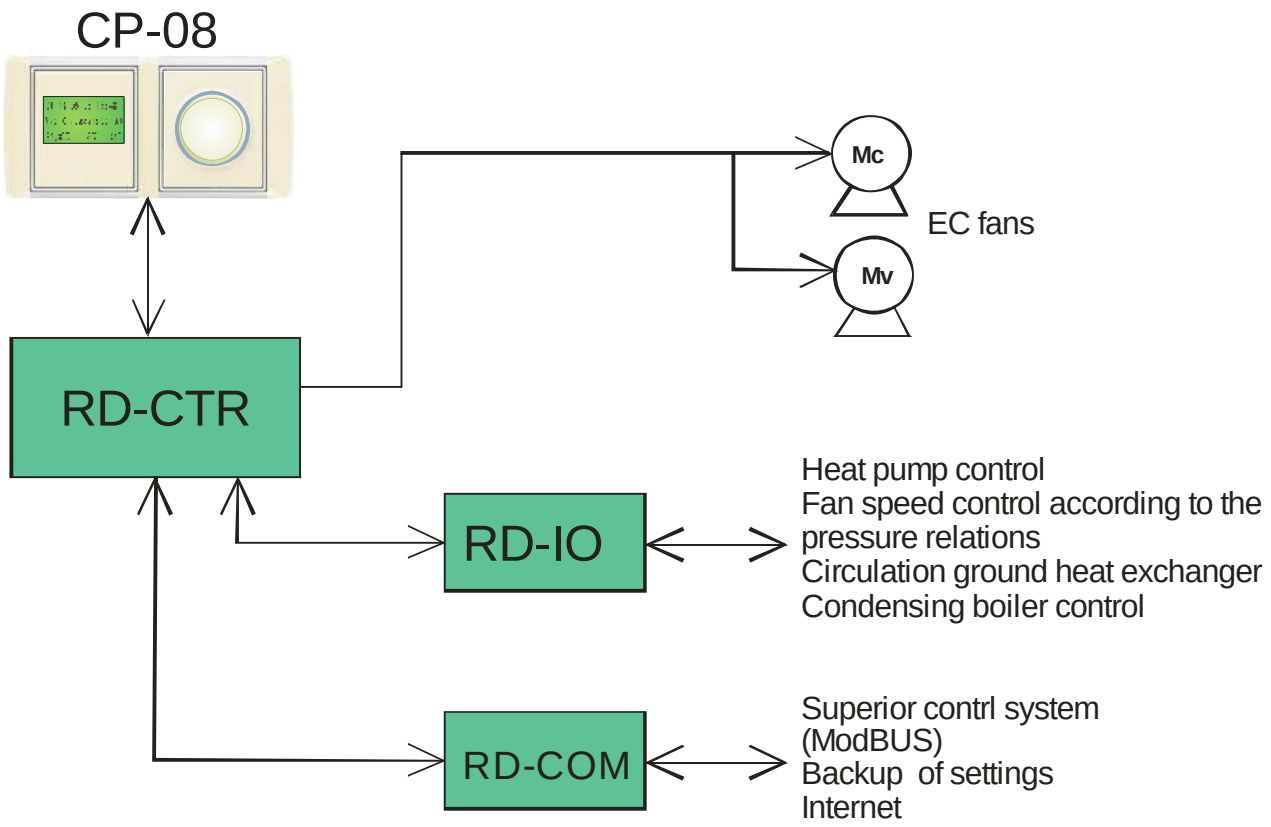


2.2 Description of terminals

	Terminal	Description	Purpose	Type
Power supply inputs	L	Power supply (230V, 50Hz)	Servo drive power supply	230V
	24V	Control module board power supply		24V DC/18V AC
	24V	Control module board power supply		
Control inputs	D1	Input No.1	Toilet, bathroom	230V [2mA]
	N1	Neutral No.1		
	D2	Input No.2	Toilet, bathroom	230V [2mA]
	N2	Neutral No.2		
	D3	Input No.3	Toilet, bathroom	230V [2mA]
	N3	Neutral No.3		
	D4	Input No.4	Kitchen	230V [2mA]
	N4	Neutral No.4		
	STP	Input – STOP contact	E.g. fire alarm	Voltage contact
	GN	Input - ground		
	TR	Input - thermostat	Bathroom thermostat	Voltage contact
	GN	Input – ground		
	IN1	Input – analogue control (0 – 10V)	Sensor C02,φ,hygrostat	0-10V SS *
	GN	Input – ground		0-10V SS *
	IN2	Input – analogue control (0 – 10V)	As IN1, or replacement of D11, input for CRK, capilary thermostat	0-10V SS *
	GN	Input – ground		0-10V SS *
Motor output	Mc	Circulation fan	Mc control	0-10V SS *
	Mv	Ventilation fan	Mv control	0-10V SS *
Servo drive output	SV	Servo drive- underground exchanger	Damper ZVT/pump ZVTs	230V/50Hz Relay 0.5A
	SB	Servo drive –bypass	Bypass damper	24V [2VA]
	SBI	Servo drive –bypass (inversion function)	Bypass damper	24V [2VA]
	24V	Power supply (+24V) – servo 0-10V	Mixing damper control	24V SS
	SC	Control (0 – 10V) – mixing damper	Mixing damper control	0-10V SS *
	LS	Control (0 – 10V) – TPO junction, electric heater		0-10V SS *
	GN	Ground - servo 0-10V	Mixing damper control	Ground
	SZ1	Zone ventilation servo drive 1	Zone 1 damper	24V [2VA]
	SZ2	Zone ventilation servo drive 2	Zone 2 damper	24V [2VA]
Signal outputs	YV1	Output – EUV1	Heating branch valve 1	230V
	YV2	Output – EUV2	Heating branch valve 2	230V
	K	Output – boiler (voltage-free switch contact)	Heat source activation	Relay 230V / 0,5A
	K	Output – boiler (voltage-free switch contact)	Heat source activation	
	GN	Output - ground		Ground
	EXT	Output - programmable (reserve)	E.g. closed with D4 on (kitchen extraction)	24V [2VA]

Sensors	VC	TA sensor power supply	+5 V
	TA	TA sensor	Communication with sensor
	GN	TA sensor ground	Ground
	VC	Ti2 power supply	+5 V
	TI2	TI2 sensor, manostat PFR	Communication with sensor
	GN	Ground, manostat	Ground
	TE	TE sensor (+24V)	24 V SS
	TE	TE sensor (measurement resistor to ground)	Resistor to ground
Controller	PW	Controller power supply	12V/SS
	COM1	Controller communication	Specification HW LIN
	GN	Ground (controller)	Ground
External board EXP	PW	External board EXP power supply	12V/SS
	COM2	Communication with EXP	Specification HW LIN
	GN	Ground	Ground

2.3 Control topology



2.4 Module overview

RD-CTR board
- Contains program features to control the entire system, evaluates data on temperatures measured and the status of inputs, on the basis of which it switches HVAC modes,
- Communicates with all other modules,
- Contains inputs and outputs for the basic HVAC accessories of DUPELX R and EC units,
- Depending on the setting of the unit (RD or EC) provides a respective range of individual inputs and outputs.

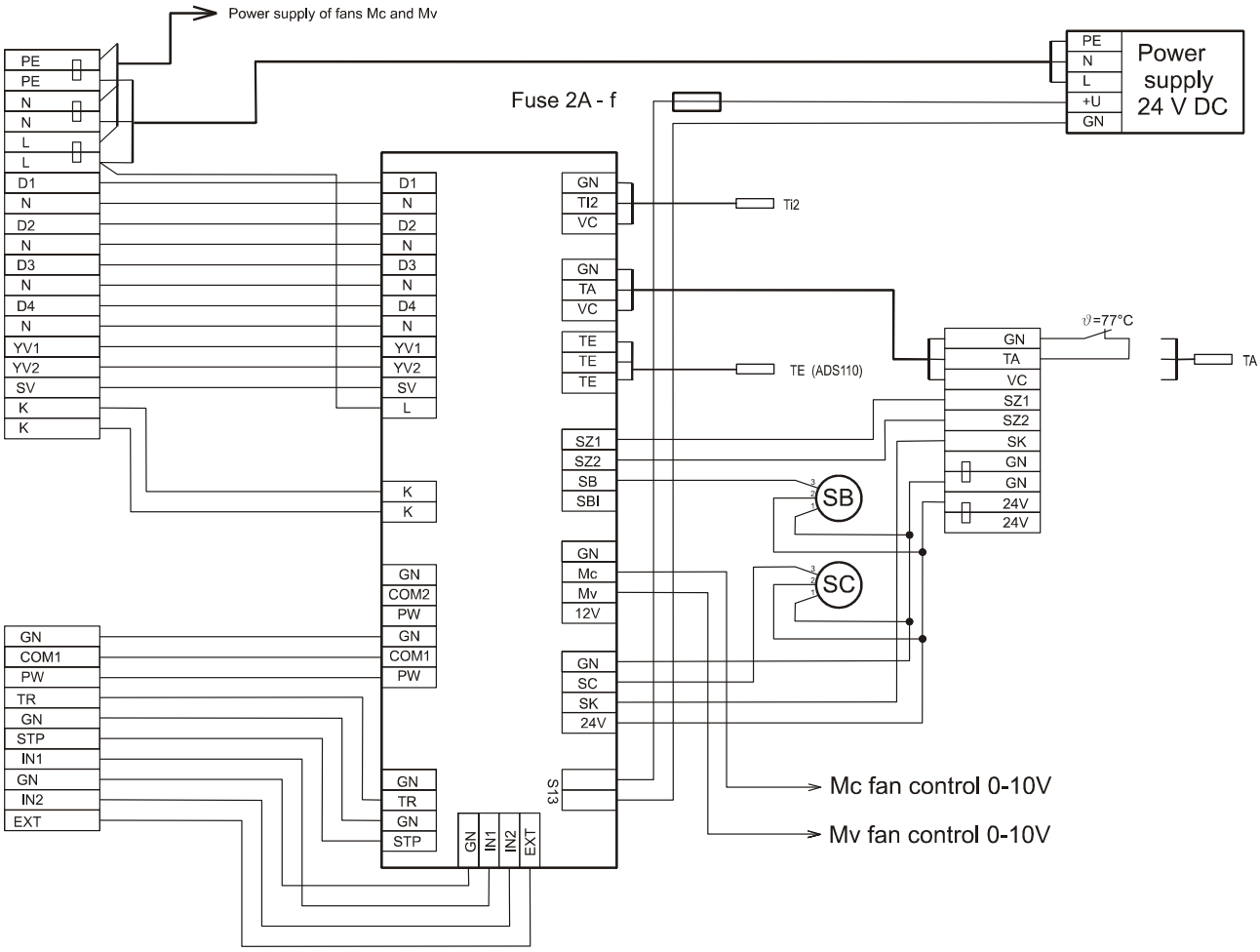
Controller CP-08
- Sets HVAC modes (manually or according to a weekly program)
- Substitutes for a thermostat function (temperature settings manually or according to the weekly program) – only if the controller is connected to the unit DUPLEX R_
- Communicates with the RD-CTR board,
- Displays HVAC unit status.
- Sets zone ventilation and other functionalities
- Depending on the unit installed the range of displayed data and setting menus

RD-IO board
- The board contains inputs and outputs for additional devices for DUPLEX R units (ground exchanger, heat pump control…),
- Communicates with the RD-CTR board that controls it,
- Used for DUPLEX R units only

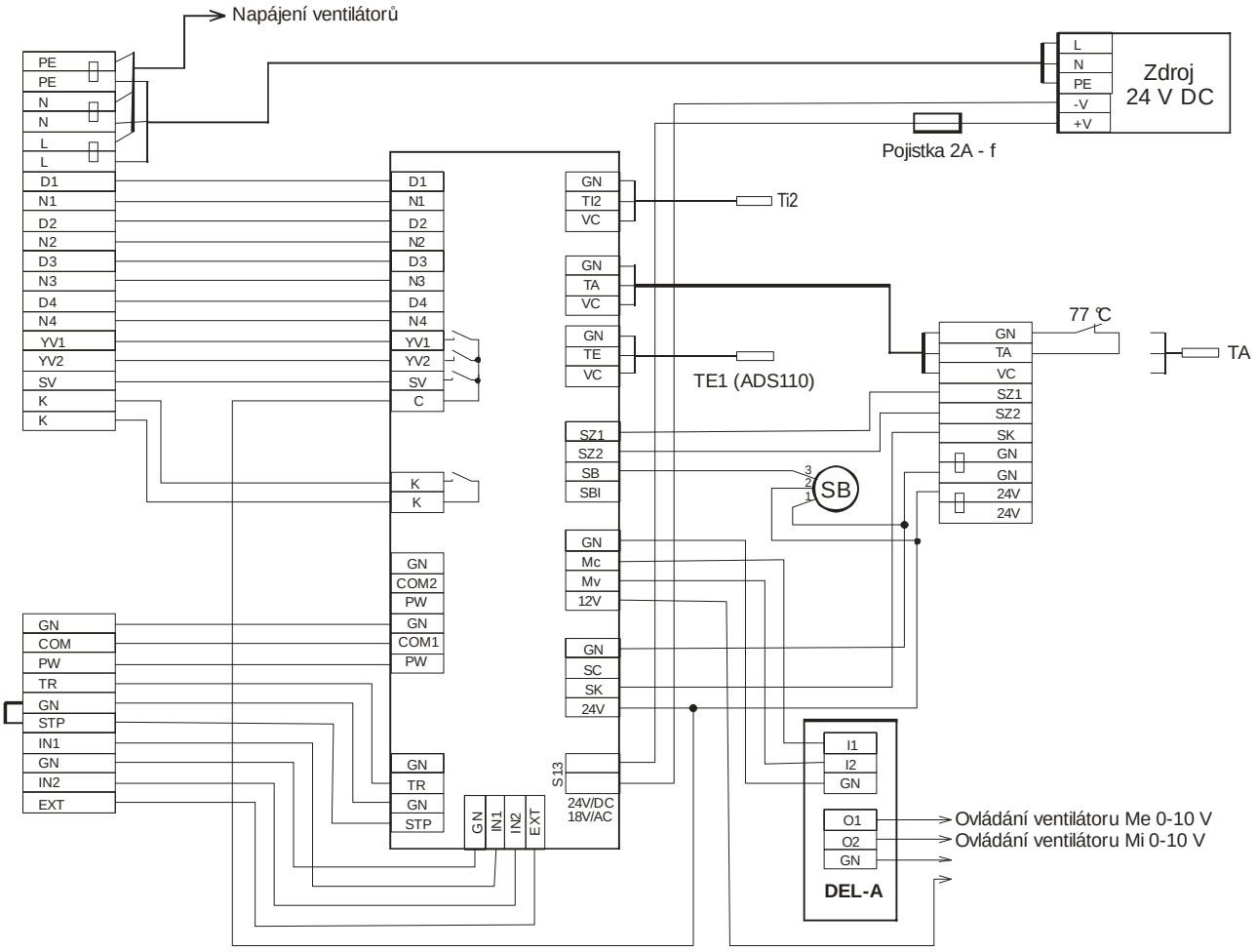
RD-COM board
- The board contains inputs and outputs for communication with external devices – superior control, Internet, signalling devices ,
- Communicates with the RD-CTR board.

3 RD-CTR for DUPLEX EC

3.1 Internal connections of RD-CTR



3.1.1 HVAC units DUPLEX 230EC and 250 ECV



3.2 Ventilation modes of DUPLEX EC units

The unit offers 3 basic ventilation modes:
Off – the unit is switched off; it only reacts to external outputs,
Periodic ventilation – the unit switches on automatically at set intervals or depending on the use of external inputs. The unit reacts to external inputs (D1 to D4) and IN1 and IN2 inputs. During periodic ventilation the unit works at a set flow rate.
Ventilation– The unit continuously works at a set flow rate, reacts to the switching of an external input (D2 to D4) or input IN1 and IN2.

3.3 External inputs

D1-D3 – inputs with a programmable delay of start-up and run-down times

- Start-up delay 0-5 minutes
- Run-down delay 0-10 minutes
- Effects on HVAC modes just started is shown in the table above
- Each input has its own adjustable delay time (button-controlled switch-on or association with lighting activation in the room)
- Delay times are influenced by service setting parameters (number of people, air tightness etc.) and outdoor temperature.

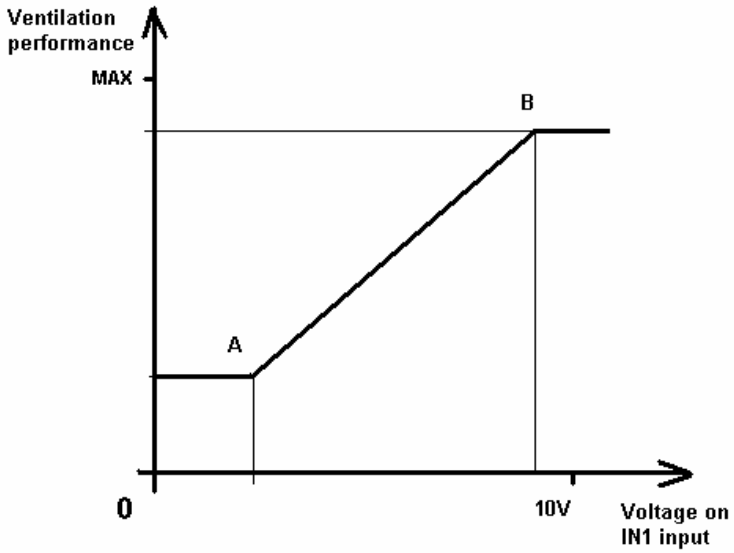
D4 – switches a mode on and off according to the table above without delay or run-down times.

3.4 Stop contact

When STP and GN terminals open, the fans of the HVAC unit stop and all dampers are closed (respective outputs have no voltage or are open).
At that point, the CP-08 RD controller displays “STOP“.

3.5 Analogue inputs IN1 and IN2

IN1 – A universal 0-10V input or a switch contact – distinguishable by a parameter
- Controls ventilation depending on humidity and CO2 concentration sensors
- During control via 0-10V control limits may be set – point A and point B



IN2 – a universal 0-10V input or a switch contact – distinguishable by a parameter
- Controls ventilation depending on humidity and CO2 concentration sensors ,
- During control via 0-10V control limits may be set – point A and point B, same as IN1
- When IN1 and IN2 inputs are combined, ventilation runs according to a higher requirement

Note: When the input is set as contact (on/off), then only the demanded power performance is set by parameters in the service menu. The set level of the performace is activated when the inpit (IN1 or IN2) is connected to the GN terminal.

3.6 Temperature sensor TA

The TA sensor is not mounted on the HVAC unit defaultly – protective thermocontact is conected between the TA and GN terminals.
When any heater is add to the system, the TA duct temperature sensor must be mounted behind the heater. Use the ADS120 sensor.

1. The sensor monitors maximum temperature behind the heater, a range between 20 and 50°C can be set by a parameter. When this temperature value is exceeded, the heater (or the heat source) turns off, and is started again after the temperature has dropped 3 °C below the selected limit.
2. The sensor monitors the exchanger freezing.

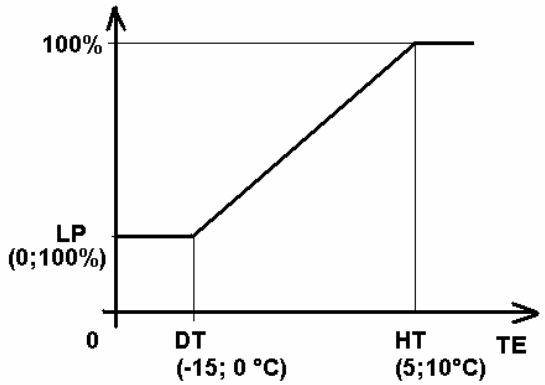
- When **TA** drops to ≤ 12 °C ... 1st anti-freeze protection is signalized, return to above 14 °C
- When **TA** drops to ≤ 7 °C , only when the "water heater" is selected",
    - If the unit's performance is **OFF**, **KK** and **YV1** outputs close (to switch on heating)**,** the **SB** output opens (to close the bypass), the CP-08 shows "2nd anti-freeze protection", does not respond to external signals. The fans are stopped in this case.

3. Anti-freeze protection: if TA> 77°C, all dampers then close (servo drive terminals without power supply), fans are off, the CP-08 RD shows "High TA temperature".
4. If an **electric heater** is connected to the DUPLEX EC unit, the thermostat function is blocked depending on the Ti room temperature. The weekly thermostat program applies to TA temperature control, i.e. temperature behind the heater.
5. If no electric heater is connected to the EC unit (parameter 204 = Tpy), the CP-08 may substitute for the thermostat function – depending on the relationship between required and room temperature is closed the K-K contact.

3.7 TE temperature sensor

Outdoor temperature sensor

- Controls the bypass damper:
    - At temperature TE>TEmin the bypass damper is open. TEmin is determined by the parameter "267 Bypass Dt".
    - At temperature TE>TEmax the bypass damper is closed. TEmin is determined by the parameter "268 Bypass Ht".
    - .
- Reduces the ventilation run-down time when activated by inputs D1 to D3:
- Reduction is permitted within 0-100%
- Lower temperature interval (-15, 0°C)
- Higher temperature Interval (5, 10°C)



The parameters of ventilation time reduction are calculated automatically on the basis of the number of people, the walled area, the airtightness of the building and the calculation temperature.

3.8 Temperature sensor TI2

1. Anti-freeze protection: if Ti2> 77°C, all dampers then close (servo drive terminals without power supply), fans are off, the CP-08 RD shows "High TI2 temperature".
2. Anti-freeze protection of the heat exchanger: if temperature TI2 is lower than the selected minimum, fans Me and Mi are turned on according to the table below, the CP-08 RD show the text "Recovery frozen", the bypass damper closes.

Mode	Me	Mi	Bypass	Inlet dampers	Heater
Recovery exchanger defrosting	**20% performance (flow rate)**	**50% performance (flow rate)**	**Open**	**0**	**According to a demand**

3.9 Outputs SZ1 and SZ2

Outputs SZ1 and SZ2 are normally open. The outputs are switched following the logical procedure below:

- If there is no requirement for the ventilation of the given zone, both outputs are open,
- If there is a requirement for the ventilation of Zone 1, output SZ2 closes and thereby closes Zone 2, therefore only Zone 1 is ventilated,
- If there is a requirement for the ventilation of Zone 2, output SZ1 closes and thereby closes Zone 1, therefore only Zone 2 is ventilated,

4 Heater types

The HVAC units DUPLEX EC/ECV which are equipped with the RD-CTR control module can cooperate with following types of heater:

- Warm water heater with a thermostatic valve (parameter 204=TPV)
- electric heater (parameter 204=EL)
- Warm water heater with a controlled valve 0-10V (parameter 204=RTP)

Each type of heater is controlled in different way and different terminals are used. The following text specifies all that features.

Units DUPLEX EC/ECV are not equipped with the TA temperature sensor from manufacturer (the sensor behind a heater). A protective thermocontact is connected between the terminals TA and GN. When a temperature in the section of the supply fan Me is higher then 77°C, the thermocontact disconnects the TA terminal from the GN – the overheating of TA is displayed.

4.1 Water heater with thermostatic valve

When the HVAC system equipped with DUPLEX EC/ECV includes a water heater with thermostatic valve, the HVAC unit enables or disables the heater running. The control of the supply air behind the heater is done by the thermostatic valve.

Inputs and outputs function:

Source / Parameter	Inputs		Outputs		
	CP 08 RD	TR	YV1	YV2	K-K
Parameter 204=**TPV**	OFF	1	0	1	1
	ON	0	1	0	0
	ON	1	1	1	1

Key:
0 – switched off
1- switched on
CP 08 RD – enables or disables warm water to flow to the heater; opens the on/off valve YV1.
TR – input for connection of an independent room thermostat; controls the output YV2 and KK directly.
IN2 – disconnetion with the GN terminal trigers the “water heater frost” status (capilary thermsotat on the heater)

4.2 Electric heater

Electric heater is controlled by pulses of voltage 10V on the SK terminal. A heater with the SSR switching for the heating coils is supposed (e.g. EPO-V heaters).

Source / Parametre	Inputs		Outputs		
	CP 08 RD	TR	SK	YV2	K-K
Parameter 204=**EL**	OFF	1	0	1	1
	TA<Tp	0	Pulses 10V – extending	0	0
	TA>Tp	1	Pulses 10V – reducing	1	1

Key:
TA – temperature sensor behind the heater– duct sensor ADS 120
Tp – demanded temperature set by the CP 08 RD controller (manual or weekly program)
Pulses 10V – period of the pulses is 12 seconds – when the TA<Tp, the pulse of 10V is being prolonged within the period of 12 second. When TA>Tp, the pulse of 10V is being reduced within the period of 12 second.

4.3 Water heater with controlled valve

Water heater with controlled valve must be equipped with an actuator designed for the 0-10V control voltage. (e.g.. type Belimo LM-24SR)
The position of the actuator is controlled by the SK terminal voltage.

Source / Parameter	Inputs		Outputs			
	CP 08 RD	TR	SK	YV1	YV2	K-K
Parameter 204=**RTP**	OFF	1	0	0	1	1
	TA<Tp	0	0-10V Voltage– rising	1	0	0
	TA>Tp	1	0-10V Voltage– dropping	0 when SK=0V	1	1

Key:
SK voltage – the value of voltega accords to the rate of TA a Tp temperatures – the change of the voltage is performed in 1 minute interval, the size of voltage step is changed proportionally according the TA and Tp variation.

5 Maintenance functions

Filter replacement warning
The control system does not indicate the actual filter status, but only the time elapsed from the last confirmation of air filter replacement.
The CP-08RD display shows “Filter” in the place of the HVAC mode – by turning the rotary controller information on the current HVAC mode is shown (same as while in heating mode the outdoor temperature value and the text “Heating” are shown alternately).
This text should lead to the user replacing the filter in the HVAC unit.
After replacement, the text “Filter” is deactivated in user settings. The moment the text is deactivated, the date of the next warning is calculated: *date of warning deactivation + 90 days.*
Filter replacement cannot be confirmed if the replacement warning is not activated – i.e. the date of replacement warning activation cannot be altered before the user is alerted to the filter status.

6 Description and functions of the CP 08 RD controller

The controller is used for the full control of the heating and ventilation (hereinafter referred to as "HVAC") units mentioned here.
The controller can work either in manual mode, wherein the user directly selects the unit's operating mode, or in automatic mode, which controls the unit according to a weekly program.
The controller distinguishes between HVAC operation within the heating season and outside it – it is possible to set a separate weekly program for the heating and non-heating season.
Functions available to the user are described in the separate document "CP 08 RD Controller – User's Manual".

6.1 Controller modes

The controller can work in two modes:

- **Basic mode** – in this mode the display shows the HVAC mode and room temperature. This mode allows you to set current temperature or the HVAC mode according to chapter ….
- **Setting mode** – in this mode all settings of the controller and the behaviour of the HVAC unit can be set. Open the controller's setting mode by a long press on the rotary controller (approx. 3 seconds).
  - An overview of setting mode items is in chapter 8.2.

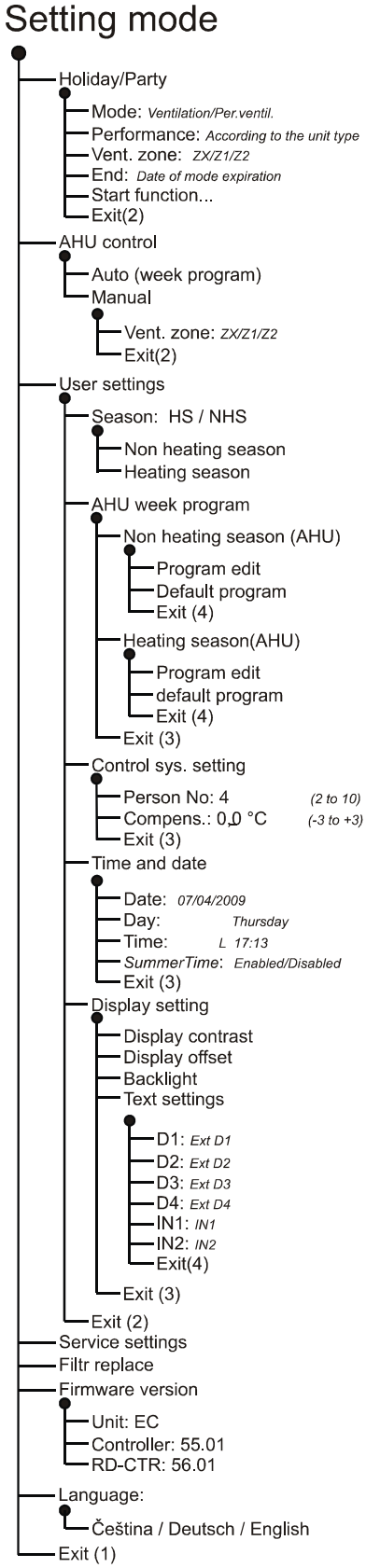
7 Types of units and performance levels

Various performance levels can be set depending on the type of the DUPLEX EC unit installed. There are 14 performance levels to be set. The table below shows the individual performance levels depending on the unit type in use:

DUPLEX	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
230 EC	0	30	50	65	80	95	110	125	140	155	170	185	200	215	230
330 EC	0	50	70	90	115	140	160	180	200	220	240	265	290	310	330
500 EC	0	60	90	120	150	190	230	270	310	350	380	410	440	470	500
250 ECV	0	30	50	70	85	100	120	135	150	165	180	195	210	235	250
380 ECV	0	50	75	100	125	150	175	200	225	250	275	300	325	350	380
540ECV	0	60	95	135	170	210	245	280	320	355	390	430	465	505	540

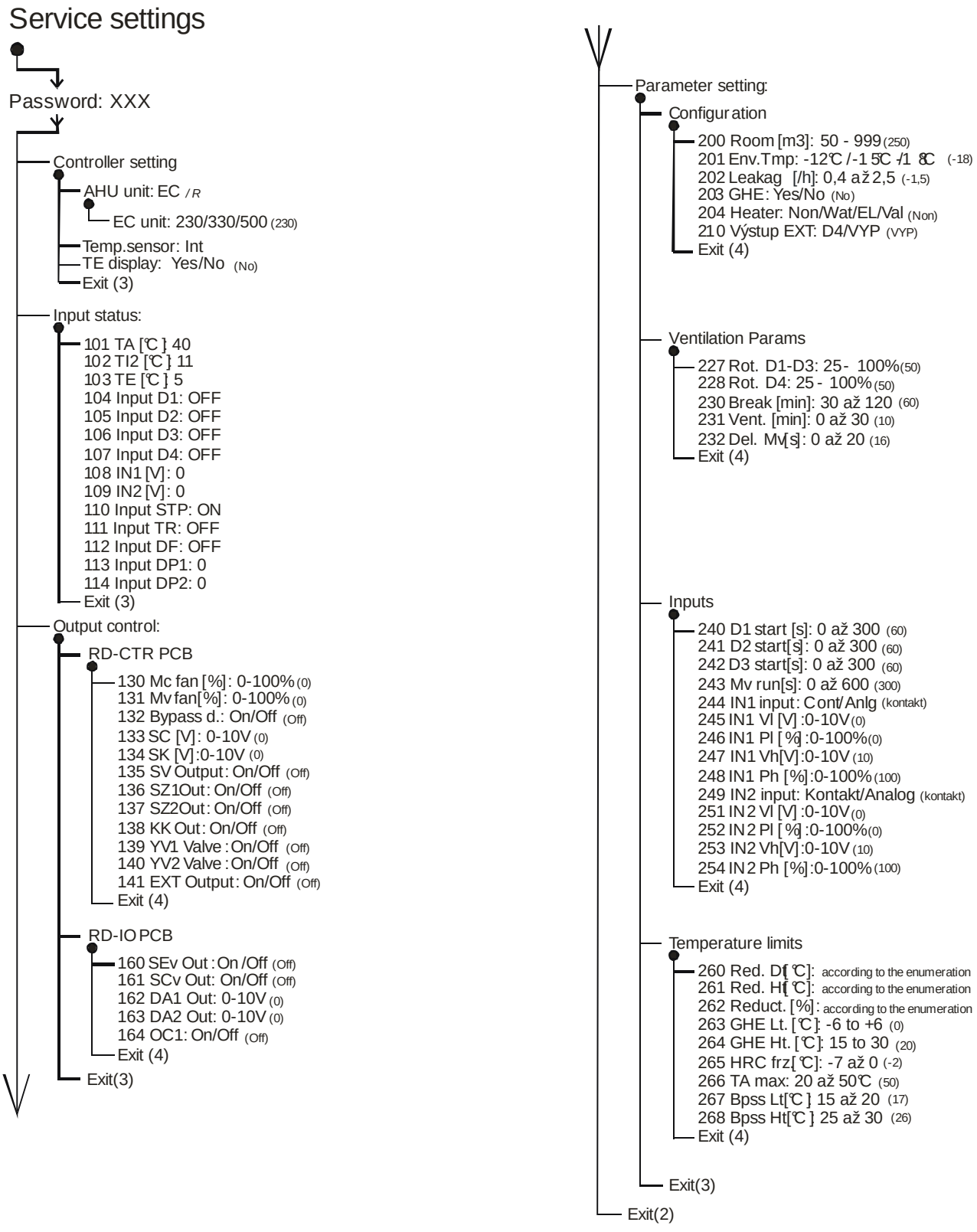
8 Control settings

8.1 User-accessible view



8.2 Service setting menu of DUPLEX EC units

The service setting menu is protected by a code, which changes automatically according to the day of the week; it is a three-digit code and starts with a number indicating the sequence of the day of the week. Each number is always one higher than the previous one, e.g. if the current day is Tuesday, the code for accessing the setting menu is 234.



8.3 Service setting parameters

This chapter describes the selected parameters of the service setting menu.

8.3.1 Unit setting – Controlled unit

The parameter is used for the selection of the HVAC unit connected, and provided that the EC unit is selected, it also sets the unit's performance. If the unit type is not specified, the unit connected cannot be controlled by the CP 08 RD controller.

Warning:
If the unit type has already been selected and it is necessary to change the unit type or its performance level, all parameters and weekly program settings will be deleted as a result of such a change.

8.3.2 Input status

The range of parameters displayed depends on the level of control equipment, e.g. if an RD-IO board is not fitted, inputs 112 to 114 are not displayed.

101 to 103
Measured temperature displayed – outdoor temperature TE – exhaust air temperature behind the exchanger TI2 – air temperature behind the heater TA.

104 to 107
Status of external inputs D+ to D4 – normally OFF

108 and 109
Status of inputs IN1 and IN2. If the selected input is programmed as an analogue one (parameter 244 or 249 = Analogue), the level of voltage at the input within the range of 0 to 10 V is displayed directly. If IN1 and IN2. If the selected input is programmed as a contact one (parameter 244 or 249 = contact), the input status is as follows:
5.7 V ~ disconnected from terminal GN
0.0 V ~ connected to terminal GN

110
Stop contact – normally ON, the unit is switched on, connected to terminal GN by the manufacturer.

111
External thermostat contact – normally OFF

141
EXT output function – Setting OFF – the output is OFF permanently
Setting D4 – the output is ON when the D4 external input is activated (e.g. the kitchen damper control)

8.3.3 Output control

This section allows you to change temporarily the status of the RD-CTR board and the RD-IO board if installed. After leaving service settings, all outputs will set according to the required HVAC mode and operating conditions (input status, temperatures measured etc.).

8.3.4 Parameter settings

8.3.5 Configuration

Parameters 200 to 202 are used as base values for setting the ventilation interval period in *Periodic ventilation* mode. Besides these parameters, setting the number of people in the building also applies (set in the user setting section).

200 Walled area - The total area of the ventilated part of the building – value in m^3

201 Calculated temperature - Calculated outdoor temperature assumed during the HVAC project design phase

202 Airtightness – The total air permeability of the building. Set to 1.5 by the manufacturer. The value corresponds with the air flow rate in 1 hour related to the total measured space volume at a pressure difference of 50 Pa compared to the outdoor environment, i.e. if the volume of the space measured 500 m3, then the air flow rate in 1 hour at the total air permeability of 1.5 will be 750 M3 (at a pressure difference of 50 Pa).

8.3.6 Ventilation parameters

227 Performance of D1-D3 – HVAC unit performance setting when external inputs D1-D3 are switched. The value is set in % of the total performance of the unit type used. The actual performance of the unit will correspond to the value set here, at that moment, the nearest performance level out of the 14 levels will be displayed in the controller's basic mode.

228 Performance D4 – HVAC unit performance setting when external inputs D4 is switched. The unit's performance will correspond to the setting as in the parameter 227 setting above.

230 Period – A value set in minutes (30 to 120) specifying the HVAC unit's idle time between ventilation intervals in Periodic ventilation mode. The set idle time of the unit always starts to run from the last stoppage of the fans. This applies regardless of whether the HVAC unit was running within periodic ventilation operation or as a result of external output switching or the status of input IN1, IN2. Factory setting is 60 minutes.

231 Ventilation – A ventilation interval value in minutes. The value is calculated on the basis of setting parameters 200 to 202 and the number of people. The value cannot be changed, in order to adjust ventilation change the number of people or the setting of interval 230.

232 Delay time – A value in seconds (0 to 20ú. It specifies the delay time of fan start-up after the inlet (possibly also outlet) damper began to open.

8.3.6.1 Inputs

240 to 242 Delay time D1 to D3- Setting of the delayed response of inputs D1 to D3. The HVAC unit starts up only if any of inputs (D1,D2 or D3) stays on longer than the delay time. The delay time is set for each input separately. It is set in seconds in the range from 0 to 300.

243 Run-down time – Setting of the ventilation run-down time of the HVAC system after switching by external inputs D1 to D3. The run-down time is identical for all inputs. It is set in seconds in the range from 0 to 600. The actual run-down time is adjusted according to current outdoor air temperature, the number of people entered and the total air permeability parameter set.

244 Input IN1 – Setting the method of control of input IN1 – Analogue (0-10V) or Contact (connection to GN)

245 UdIN1 – Setting the bottom voltage level at input IN1 in point A, see chapter 3.5, setting in the range 0-10V

246 Pd IN1 – Setting the bottom performance level at input IN1 in point A, see chapter 3.5, setting in the range 0-100%

247 Uh IN1 – Setting the top voltage level at input IN1 in point B, see chapter 3.5, setting in the range 0-10V

248 Ph IN1 – Setting the top performance level at input IN1 in point B, see chapter 3.5, setting in the range 0-100%. If the IN1 input is set as a contact one, this parameter sets performance when the IN1 input switches at GN.

249 Input IN2 – Setting the method of control of input IN2 – Analogue (0-10V) or Contact (connection to GN)

250 UdIN2 – Setting the bottom voltage level at input IN2 in point A, see chapter 3.5, setting in the range 0-10V

251 Pd IN2 – Setting the bottom performance level at input IN2 in point A, see chapter 3.5, setting in the range 0-100%

252 Uh IN2 – Setting the top voltage level at input IN2 in point B, see chapter 3.5, setting in the range 0-10V

253 Ph IN2 – Setting the top performance level at input IN2 in point B, see chapter 3.5, setting in the range 0-100%. If the IN1 input is set as a contact one, this parameter sets performance when the IN2 input switches at GN.

8.3.6.2 Temperature limits

260 to 262 – The parameters of ventilation time reduction as per chapter 3.7. The parameters can be viewed, not altered. Parameter values are calculated on the basis of setting parameters 200 to 202 and the number of people entered.

263 ZVT min – Setting the bottom temperature level in °C for closing the ground heat exchanger and opening suction from the inlet in the façade. If TE temperature is higher than the limit set here, the SV output is switched and fresh air is supplied directly from the inlet neck in the building's façade. If the ground exchanger is not installed, the parameter has no effect.

264 ZVT max - Setting the top temperature level in °C for opening the ground heat exchanger and closing suction from the inlet in the façade. If TE temperature is higher than the limit set here, the SV output opens and fresh air is supplied via the ground heat exchanger. If the ground exchanger is not installed, the parameter has no effect.

265 Rec. froz. – Setting temperature Ti2 for the activation of the anti-freeze protection of the recovery exchanger.

266 TA max – Setting maximum TA temperature behind the heater. If the temperature measured is higher, the heat source of the selected heater is turned off.

267 Bpss Dt – Setting the bottom temperature limit for opening the bypass damper – depends on temperature TE. The bypass damper is open if Dt<TE<Ht. Setting can be done within the range of 15 to 20 °C.

268 Bpss Ht – Setting the top temperature limit for closing the bypass damper – depends on temperature TE. Setting can be done within the range of 25 to 30 °C.

9 Software upgrade

CP 08 RD Controller processor type: PIC18F87J10
RD-CTR board processor type: PIC18F8722

10 Technical specifications

Operating environment……Class 1 Indoor environment
Operating temperature and relative humidity…..…… +5 to +40 °C, up to 75% without condensation
Storage temperature and humidity …….....-20 to +60 °C, up to 75% without condensation
Battery service life / type……Minimum 5 years / CR2032, 3V
Power supply…….. 24 V AC / 18 V DC
Communication with HVAC unit……..…Digital
Temperature sensor (Ti)……Internal / external ADS-100ABB/ ADS-110 for swimming pool
Temperature sensor (TE)…….. ADS-110 exterioir
Temperature sensor (TA)…….. ADS-120 duct

11 Possible failures and troubleshooting

Failure	Cause	Solution
The controller shows seemingly high temperature	The temperature sensor is located underneath the rotary controller, during longer handling the temperature being measured is affected by the temperature of the hand that is in direct contact with the controller	Wait for several minutes after handling, the controller cover will stabilise at ambient temperature
There is no screen on the controllers display	The power supply is disconnected or the fuse of control system is broken	Check the power supply or ccheck the fuse status on the RD-CTR board.
Symbol **.* is shown instead of interior temperature	Communication failure between the external sensor and the controller, the external sensor is not connected	Check the connection of the external sensor.

12 Error and failure messages

Messages in the table below give information about non-standard or unexpected events in the HVAC unit system.

Message	Meaning	What to do?
Filter choked	The air filter in the HVAC unit is contaminated	Filtration cloth in the unit must be replaced
TE temperature sensor	Interrupted communication or a failure of the outdoor temperature sensor.	Contact the service technician
TI2 temperature sensor	Interrupted communication or a failure of the exhaust air temperature sensor.	Contact the service technician
Frozen heat recovery	Frost deposits in the heat recovery exchanger.	The air extracted from the building is likely to be too humid. Increase room temperature or use natural ventilation (open windows)
TA temperature sensor	Interrupted communication or a failure of the temperature sensor behind the hot-water heater in the unit.	Contact the service technician
1st anti-freeze protection	Temperature behind the heater is below 12°C	Check the hot water supply (boiler function, temperature in IHR). Fans stop, hot water supply to the HVAC unit starts.
2nd anti-freeze protection	Temperature behind the heater is below 7°C	Same as the with 1st anti-freeze protection
STOP circuit active	The emergency stop contact is opened.	If the stop contact is activated by a fire or other safety system, check it status
Communication failure	No communication between controller CP-07 RD and HVAC unit	Check whether the connectors of the communication cable in the controller have not moved or come off
Interior sensor	A failure of the interior temperature sensor.	Check the connection of the sensor to the CP 08 RD controller, check the position of the controller, whether it has not come off the wall.
High temperature TA	When no heater is in the system, the supply fan Mc is overheated. When a heater is in the system, then the air behind the heater is warmer then 77°C.	Switch off the power supply of the HVAC unit and electric heater (if in the system) and wait 10 minutes. Switch the power on, if the failure keeps on the display, the status ofthe MC fan should be checked, and the status of thermocontact or TA sensor (ADS120) as well