Basic Manual

IVC3 Control System

Rev 1.0

CONTENTS

1. Introduction

The control unit IVC3 is used to control an Air Handling Unit (AHU) with supply and exhaust air fans, revolving heat recovery (Rot VVX), heater (electric or water) and cooler.

2. Function

1.1 Start up

At start up the exhaust fan (EA) starts at set speed and the heat recovery at 100%. After 1 minute the supply fan (SA) starts and control unit starts temperature regulation.

If the heater is a water-heater and outdoor temperature are below “temp. pump stop” the valve for water-heater open to 50% during upstart.

2.2 Service-switch by operation unit (Settings menu – Fan Mode)

Four different operation modes can be set; STOP, NORMAL, FORCED and AUTO.

Settings	Setting	Description
Fan mode	Stop	Unit stopped
	Normal	Unit operates with SA and EA at normal speed
	Forced	Unit operates with SA and EA at forced speed
	Auto	Unit operates with fan speed according to time schedule

2.3 Fan speed, normal and forced

Four different operation modes can be set; STOP, NORMAL, FORCED and AUTO.

Settings	Setting	Description
SA normal	0-100%	SA peed at normal speed
EA normal	0-100%	EA peed at normal speed
SA forced	0-100%	SA peed at forced speed
EA forced	0-100%	EA peed at forced speed

2.4 Revolving heat recovery (VVX)

VVX can be configured as Analogue or Digital.

Setup	Setting	Description
Config. VVX	Analog/Digital	Selection if VVX is to be controlled by an analogue (o.10V) or a digital output.

Configured as digital VVX the heat recovery will start and stop intermittent:

VVX-signal	Digital VVX
0-33%	3 min run, 3 min stop
34-66%	9 min run, 3 min stop
67-100%	Continuous run

When a substantial temperature difference is detected IVC3 will immediately shift to the correct sequence without waiting for cycle time to run out.
Configured as analogue VVX the controller will only use the analogue output (0…10V DC).

A rotation guard sensor connected to a digital input detects that the VVX is running. If the rotation sensor don't register a signal within every five minutes a B-alarm generates.

The revolving heat recover are running 12 minutes every 4 hour for conditioning.

2.5 Heater

By IVC3 an electrical or a water heater-battery can be controlled (selected in operation unit)..

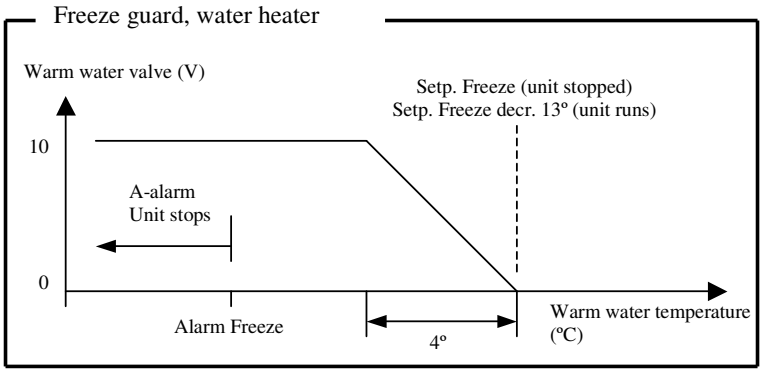
Setup	Setting	Description
Config. Heater	Water/El	Selection of a water-heater or an electrical-heater.

2.5.1 Water-heating-battery

Water-heater is controlled in sequence with heat-recovery by 0…10V signal.

Freeze guard in IVC3 controls temperature in heater-battery (Setp. Freeze) by open valve at decreasing temperature. If heater water temperature are decreasing below (Alarm Freeze) fan stops and a A-alarm generates.

Set point for freeze guard (Setp. Freeze) decreases 13° at running unit.



Circulation pump for warm water configures for either exercise or continues operation. If exercise are selected the pump will stop when outdoors temperature exceeds set limit (Temp. pump stop) plus a 2° hysteresis, pump will start when outdoor temperature decrease set limit.
The pump will always start if valve opens.

Pump run are off delayed 4 minutes.

Pump exercises one minute once a day when stopped.

Setup	Setting	Description
CP Heat	Exercise/ Cont.operation	Selects if pump should operates continuously or if it should stop during summer.
Settings	**Setting**	**Description**
Temp. pump stop	-30 - +30°C	Selection of outdoors temperature for start/stop of circulation-pump when configured as exercise
Setp. Freeze	0 - +60 °C	Setpoint for minimum water temperature at non operating unit (at operating unit the set point decreases with 13°).
Alarm Freeze	0 - +60 °C	The water temperature for a freeze alarm, an A-alarm is set up and the unit stops immediately.

2.5.2 Electrical heater.

Electrical heater are controlled in sequence with heat-recovery by a 0…10V analogue output.

At start of electrical heater the digital output will connect first and then will the analogue output starts controlling.
Fan runs set time (3 minutes) for cooling down of electrical heater when unit shut down.
At fire alarm or emergency stop fans will stop immediately without any cooling down.

2.6 Cooler

IVC3 can in operating terminal be configured to control a cooler (Not installed / Installed).

2.6.1 Cooler, pump control

Circulation pump (CP cool) for chilled water configures for either exercise or continues operation. If exercise are selected the pump will run/stop when valve opens/shuts.

Pump run are off delayed 4 minutes.

Pump exercises one minute once a day when stopped.

2.6.2 Cooler, DX-cooler

CP cool can be configured as DX cool for an one step cooler. Start and stop parameters for DX cool are to be set in parameter menu (DX cool start / DX cool stop). DX cooler are start delayed 2 minutes Heat recovery is delayed 2 minutes after a cooling sequence.

Setup	**Setting**	**Description**
Cool battery	Not installed/ Installed	Select if a cooler is to be controlled.
CP cool	Excesice/ Cont.operation/ DX-cool	Circulation pump, run at needs whit exercise. Circulation pump, continuous run. DX-cooler controls on/off by digital output.
Settings	**Setting**	**Description**
DX cool start	0 – 100%	Switch on point. Visible only when Cool battery is selected as Installed.
DX cool stop	0 – 100%	Switch off point. Visible only when Cool battery is selected as Installed.

2. 7 Chill recovery

IVC3 can in operating terminal be configured for chill recovery (Cool recycl., Not installed / Installed).

In cooling sequence the VVX will start if outdoor temperature exceeds extract air temperature more than 2°.
VVX runs with 100% during chill recovery. Chill recovery stops when extract air temperature don't exceeds outdoors temperature.

Setup	**Setting**	**Description**
Cool recycle.	Not installed/ Installed	Select if chill recovery is to be used in cooling sequence.

2.8 Selection of temperature-control mode

Four different types of temperature-control mode are available; Supply air control, Extract air control, Room control and Climate depended control (extract air at summer and supply air at winter).

Setup	Setting	Description
Regulation	Supply air reg./ Exhaust air regl./ Room reg./ Climate dep. reg	Supply air control Extract air control (cascade) Room control (cascade) Extract air cascade (summer), Supply air (winter)

2.8.1 Supply air control

Constant supply air temperature.

Settings	Setting	Description
Setp. Supply air	0-60°C	Set point supply air temperature

2.8.2 Extract air control

Constant extract air temperature with min and max limits for supply air. Extract air temperature sets set point for supply air to maintain a constant extract air temperature. Cascade factor 5.

Settings	Setting	Description
Setp. Main	0-60°C	Main setpoint extract air temperature
Min. Supply air	0-60°C	Minimum supply air temperature
Max. Supply air	0-60°C	Maximum supply air temperature

2.8.3 Room control

Constant room temperature with min and max limits for supply air. Room temperature sets set point for supply air to maintain a constant extract air temperature. Cascade factor 5.

Settings	Setting	Description
Setp. Main	0-60°C	Main setpoint room temperature
Min. Supply air	0-60°C	Minimum supply air temperature
Max. Supply air	0-60°C	Maximum supply air temperature

2.8.4 Climate adapted control

At this solution the controller operates as a exhaust air controller in summertime and supply air controller in wintertime.

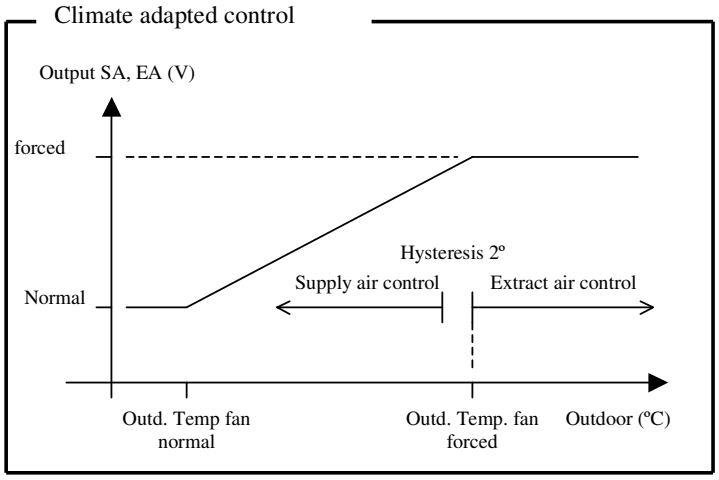
Settings	Setting	Description
Setp. Main	0-60°C	Main setpoint room temperature (summer)
Setp. Supply air	0-60°C	Set point supply air temperature (winter)
Min. Supply air	0-60°C	Minimum supply air temperature
Max. Supply air	0-60°C	Maximum supply air temperature

Outdoors temperature is according to set value shifting between control mode summer and winter. Shift point differs by a 2° hysteresis and 30 minutes delayed changing to supply air control.

Fan speed is linear reduced from forced to normal when outdoor temperature decreases from “Outd. Temp. fan forced” to “Outd. Temp. fan normal”.

Fans will gain forced speed immediately at cooling sequence even if climate controller hasn’t achieved forced speed.

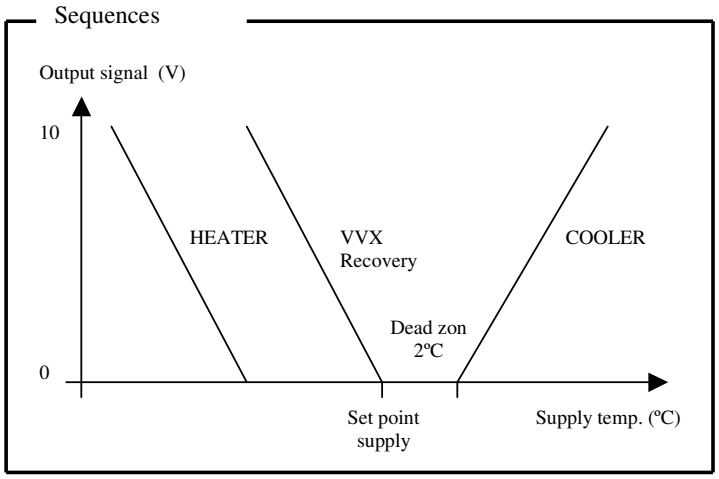
By input for external timer the fans will run on forced speed.



Settings	Setting	Description
Outd. Temp. fan normal	-30 - +30 °C	See fig. above
Outd. Temp. fan forced	-30 - +30 °C	See fig. above

2.9 Control sequence

Cooler, heat recovery (VVX) and heater will in sequence control the temperature. At warming demand the output to cooler decreases, than VVX starts (with different run/stop intervals out of needs at digital VVX or with an increasing output signal at analogue VVX) and finally increased output signal to heater.
The sequence is opposite at cooling request.



IVC3 has integrated PI-regulators for cooling and heating. PI-regulator parameters are not changeable:

	Heat seq.	Cool seq.
P-band	17°	11°
I-time	2 min	3 min

2.10 Night cooling

Night cooling is selected from operation terminal (Not installed / Installed).

Facilities are chilled with fresh outdoor air.

IVC3 measures outdoor temperature continuously during operating time to decide if night cooling are possibly after ordinary operating time. Night cooling is allowed if outdoor temperature constantly has exceeded 20° during one hour.

2.10.1 Night cooling, extract air temperature sensor

The IVC3 will after operating-time wait a set delay before starting night cooling. Controller measures extract air temperature for 5 minutes to decide if night cooling is needed. If extract air temperature after check exceeds set start limit (Night cooling start) the unit run until extract air temperature are more than 1° below start point. Unit will in night cooling run on forced speed SA and EA. Cooler, recovery and heater are always blocked during night cooling.

2.10.2 Night cooling, room temperature sensor

Controller measures continuously room temperature to decide if night cooling is needed. If room temperature exceeds set start limit (Night cooling start) the unit will start for night cooling until room temperature are more than 1° below start point. Unit will in night cooling run on forced speed SA and EA. Cooler, recovery and heater are always blocked during night cooling.

2.10.3 General conditions for night cooling

During night cooling the controller continuously compares extract air (or room) temperature with outdoor temperature for to decide if there are chill effects (extract air or room temperature has to exceed outdoor temperature with at least 4° to allow night cooling). When no chill effect are available the night cooling are shut down and (with extract air sensor) would not start until after a new start delay. With room sensor night cooling will start when chill effects are available.

Night cooling has a minimum run time of 20 minutes.

Heater is blocked 3 hour after night cooling.

2.10.4 Night cooling, settings

Setup	Setting	Description
Night cooling	Not installed/ Installed	Select if night cooling is to be used.

Settings	Setting	Description
Night cooling Interv.:	10-250 min	Delay before starting night cooling after end of daytime. Only when extract air temp. sensor is used.
Night cooling Start:	0-60°C	Start and stop temperature night cooling. Start limit: room/extract air temp. >= Start Stop limit: room/extract air temp. <= Start –1°

2.11 Night heating

Night heating is selected from operation terminal (Not installed / Installed).

IVC3 measures outdoor temperature continuously during operating time to decide if night heating is possible after ordinary operating time. Night heating is not allowed if outdoor temperature constantly has exceeded 20° during one hour

2.11.1 Night heating, extract air temperature sensor

The IVC3 will after operating-time wait a set delay before starting night heating. Controller measures extract air temperature for 5 minutes to decide if night heating is needed. If extract air temperature after check not exceeds set start limit (Night heating start) the unit would than continue until extract air temperature are more than 1° above start point. Unit will in night heating mode run on forced speed SA. It is selectable in operating terminal if EA are to be used in night heating (EA night heating). Ordinary temperature set points are used in night heating.

2.11.2 Night heating, room temperature sensor

Controller measures continuously room temperature to decide if night cooling is needed. If room temperature drops below set start limit (Night heating start) the unit will start for night heating until room temperature are more than 1° above start point. Unit will in night heating mode run on forced speed SA. It is selectable in operating terminal if EA are to be used in night heating (EA night heating). Ordinary temperature set points are used in night heating.

2.11.3 General conditions for night heating

The revolving recover are blocked if EA has been set not to run during night heating.

Night heating has a min run time of 20 minutes.

2.11.4 Night heating, settings

Setup	Setting	Description
Night heating	Not installed/ Installed	Select if night cooling is to be used.
Settings	**Setting**	**Description**
Nattvärme Interv.:	10-250 min	Delay before starting night heating after end of daytime. Only when extract air temp. sensor is used.
Nattvärme Start:	0-60°C	Start and stop temperature night cheating. Start limit: room/extract air temp. <= Start Stop limit: room/extract air temp. >= Start+1°
EA night heating	Start/Stop	Select if exhaust air fan is to be used at night heating.

2.12 Limited air flow

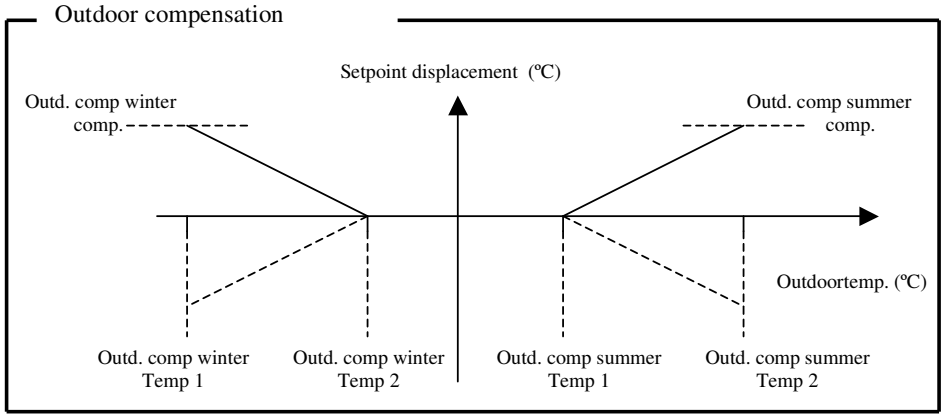
Fan speeds are reduced from forced to normal if outdoors temperature drops below set limit (Outd. Temp. fan). Fan speed returns to forced when outdoors temperature exceeds limit with more than 2°.

At climate adapted control fan speed sets linear from forced to normal out of set value (Outd. Temp. fan forced and Outd. Temp. fan normal).

Settings	Setting	Description
Outd. Temp. fan Normal:	-30 - +30 °C	Fan speed limits to normal speed at outdoor temp. below set value. (Climate dep. vent., se chapter 2.8.4)

2.13 Outdoor compensated setpoint

IVC3 are configurable for outdoor temperature compensation of set point. Summer and/or winter compensation are available. Two limits for outdoor temperature and a compensation value for each summer and winter can be set.



Settings	Setting	Description
Outd comp summer Temp 1	-30 - +30 °C	Setpoint for start of summer compensation (at this point there is no compensation)
Outd comp summer Temp 2	-30 - +30 °C	Setpoint for full summer compensation (at this point compensation has is full influence on temp. control)
Outd comp summer Comp	-30 - +30 °C	The value that compensation would achieve at “Temp 2” summer.
Outd comp winter Temp 1	-30 - +30 °C	Setpoint for full winter compensation (at this point compensation has is full influence on temp. control)
Outd comp winter Temp 2	-30 - +30 °C	Setpoint for start of winter compensation (at this point there is no compensation)
Outd comp winter Comp	-30 - +30 °C	The value that compensation would achieve at “Temp 1” winter.

2.14 Extended operating time

Extended operating time initiates by an external switch via digital input (activated by a closing contact). At extended operating time the unit runs with fans in forced speed

When external switch is turned off (open contact) the unit return to operate according to internal time schedule.

3. Alarms

3.1 Fan alarm

Fan alarm activates by fault indication from SA or/and EA after set delay. Alarm at closed contact.

Result: alarm category B, unit stops.

Setup	Setting	Description
Delay Fan Alarm	0-60 min	Time delay in IVC3 before a B-alarm is set and unit stops.

3.2 Fire alarm

Alarm activates by external fire alarm equipment. Alarm at open contact.

Result: alarm category A, unit stops.

3.3 Freeze protection alarm

Freeze alarm activates if temperature drops below set alarm limit.

Settings	Setting	Description
Alarm Freeze	0 - +60 °C	Alarm limit for freeze guard, A-alarm is set and unit stops.

Result: alarm category A, unit stops.

3.4 Alarm pump/overheating

Alarm activates by fault indication from pump or if electrical heater indicates overheating. Alarm at closed contact.

Alarm is set by a closing external contact.

Result water heater: alarm category B, unit stops if heater valve are opened, unit operates as usual if heater valve are closed.

Result electrical heater: alarm category B, unit operates as usual, electrical heater stops.

3.5 Alarm pump/cooler

Alarm activates by fault indication from pump or alarm indication from cooler. Alarm at closed contact.

Result water cooler: alarm category B, unit operates as usual.

Result cooler: alarm category B, unit operates as usual, cooler stops.

3.6 Alarm revolving heat recovery

An inductive sensor via digital input detects if VVX are running. Alarm activates if sensor don't signal every 5 minutes when VVX are operating.

Result: alarm category B, unit operates as usual.

3.7 AUX-input

The AUX-input is configurable as A-alarm, B-alarm or stop.

Alarm is set by a closing external contact.

Stop (emergency stop) activates at closed contact

Setup	Setting	Description
Config. AUX	Alarm A Alarm B Stop	AUX sets an A-alarm and unit stops. AUX sets an B-alarm, unit operates as usual. Emergency stop, unit stops, no overrun time of fans.
Delay AUX	0-60 min	Delay before an A or B-alarm is set up. Not used at emergency stop.

Result:
A-alarm: Unit stops.
B-alarm: Unit operates as usual.
Emergency stop: Unit stops, no overrun time of fans. No alarm is set up.

3.8 Temperature deviation alarm (Alarm temp. fail)

If supply air temperature constantly deviates from setpoint more than set limit during 30 minutes a B-alarm is set up. If supply air temperature would deviate another 5° an A-alarm is set up and the unit stops.
On a rise in supply air temperature a deviation would only result in a B-alarm and unit operates as usual.
No alarm would be set up at a unit without cooler if outdoor temperature exceeds +20°C.

Settings	Setting	Description
Alarm temp. fail	0-60°C	Deviation limit from setpoint for supply air temperature, a B-alarm is set up after more than 30 minutes deviation. An A-alarm is set up and unit stops if temperature drops more than 5° below low limit.

4. Time schedule

At Fan mode set to Auto the unit operates according to settings in time schedule at the Clock menu.

Time schedule sets from operating terminal.

Four events (time and mode) a day can be set.

The times can be set to hours or half-hours. At each set time an operating mode (stop, normal or forced) is to be set, unit runs on set mode until a new mode appears in time schedule..

Time schedule can be configured for individual day settings or groups (workdays and weekend).
Four different time events are to be set for each day (1-7) when configured as individual day.
Four different time events are to be set for workdays (1-5) and four events for weekend (6-7) when configured as groups.

IVC3 is equipped with a real time clock for weekdays, hours and minutes.
The real time clock has power back-up.

Clock	Setting	Description
Actual time	Time: 00:00-24:00 Day: 1-7	Actual day, hour and minute
Program. mode	D= 1-5, 6-7 D= 1,2,3,4,5,6,7	Group settings (workdays and weekend) Individual day settings
Day: X(-X) **Time:** X 00:00 **Mode:** Stop	Time: 00:00-23:30 Mode: Stop,normal,forc.	Setting of event time (hour or half-hour) for each day (four different) or each group (four different) and operating mode for each event. ▲-button or ▼-button to manoeuvre in time schedule.

5. Manual overrun of output

The outputs can be manual set (0-100%) by operating terminal at test and function control.

Setup	Setting	Description
Manual operation	Off/On	Make outputs available for manual overrun

Run-LED (yellow) pulse indicates when an output is manually set.

Only configured outputs are enable for manual overrun. Not configured outputs are hidden or displayed not installed.

Settings	Setting	Description
SA man.	0-100%	Supply air fan, manual overrun output-value
EA man.	0-100%	Exhaust air fan, manual overrun output-value
Rot. VVX man.	0-100%	Revolving heat recovery, manual overrun output-value
H-valve man.	0-100%	Heater valve, manual overrun output-value
C-valve man.	0-100%	Cooler valve, manual overrun output-value
El heater man.	0-100%	Electrical heater, manual overrun output-value
CP heat man.	0-100%	Cirkulation pump, manual overrun output-value
CP cool man.	0-100%	Cirkulation pump, manual overrun output-value
DX cool man.	0-100%	Cirkulation pump, manual overrun output-value

6. LED

LED on operating terminal and controller indicates RUN and ALARM status.

6.1 LED – RUN

Diodstatus	Function
Dark	Unit stop
Pulse	Manual run
Lit	Normal run

6.2 LED - ALARM

Diodstatus	Function
Dark	No alarm
FastLit	Alarm

7. Description of In- and Outputs

7.1 Digital outputs (relay)

1. Pump, heater / electrical heater (230 VAC)
2. Pump, cooler / DX-cooler (230 VAC)
3. Supply Air fan, SA (24 VAC)
4. Exhaust Air fan, EA (24 VAC)
5. Collective fault A (24 VAC)
6. Collective fault B (24 VAC)

7.2 Digital output (triac)

1. Revolving heat recovery, VVX (230 VAC)

7.3 Analogue output (0…10 VDC)

1. Heater
2. Cooler
3. Supply Air fan, SA
4. Exhaust Air fan, EA
5. Heat recovery, VVX

7.4 Analogue input (passive sensor)

1. Supply air temperature -30℃ - +80℃
2. Outdoor air temperature -30℃ - +80℃
3. Freeze protection temperature -30℃ - +80℃
4. Exhaust air / room temperature -30℃ - +80℃

7.5 Digital input (from free contacts)

1. Alarm fans
2. Extended operation input
3. Rotation guard VVX (inductive sensor)
4. Fire alarm
5. Alarm heater pump / alarm electrical heater
6. Alarm cooler pump / alarm cooler
7. AUX-input

8. Complete parameter lists

8.1 Menu – ”Status”

Parameters displayed in the Status menu are only readable.

Parameter	Range	Description
Setp. Main	-30 - +80°C	Display actual main setpoint
Setp. Supply air	-30 - +80°C	Display actual supply setpoint
Outdoor air	-30 - +80°C	Display actual outdoor temperature
Supply air	-30 - +80°C	Display actual supply air temperature
Room/Extract air	-30 - +80°C	Display actual room/extract air temp.
Freeze guard	-30 - +80°C	Display actual heater temperature
Heat	0 – 100%	Display actual heater output
Rot. VVX	0 – 100%	Display actual recovery output
Cool	0 – 100%	Display actual cooler output
SA	0 – 100%	Display actual supply air fan output
EA	0 – 100%	Display actual exhaust air fan output

8.2 Menu – ”SETUP”

In Setup menu are all configurations made.

Parameter	Range	Description	Default
Meny/Menu	Svenska/English	Selection of language.	Svenska
Config. heat	El/Water	Selection of a water or an electrical heater	Water
CP heat	Exesice/Cont.operation	Selects if pump should operates continuously or if it should stop during summer.	Exercise
Cool battery	Not installed/Installed	Select if a cooler is to be controlled.	Not installed
CP cool	Exercise/Cont.operation/DX cool	Circulation pump, run at needs with exercise. Circulation pump, continuous run. DX-cooler controls on/off by digital output.	Exercise
Config. VVX	Digital/Analog	Selection if VVX is to be controlled by an analogue (o.10V) or a digital output.	Digital
Night cooling	Not installed/Installed	Select if night cooling is to be used.	Not installed
Night heating	Not installed/Installed	Select if night heating is to be used.	Not installed
Regulation	Supply air reg./ Exhaust air regl./ Room reg./ Climate dep. reg	Supply air control Extract air control (cascade) Room control (cascade) Extract air cascade (summer), Supply air (winter)	Supply air reg.
Cool recycl.	Not installed/Installed	Select if chill recovery is to be used in cooling sequence.	Not installed
Config. AUX	ALARM B/ALARM A/STOP	AUX sets an A-alarm and unit stops. AUX sets an B-alarm, unit operates as usual. Emergency stop, unit stops, no overrun time of fans.	ALARM B
Delay AUX	0-60 min	Delay before an A or B-alarm is set up. Not used at emergency stop.	3 min
Delay Fan Alarm	0-60 min	Time delay in IVC3 before a B-alarm is set of and unit stops.	3 min
Manual operation	Off/On	Make outputs available for manual overrun	Off

8.3 Meny – ”Settings”

In Setup menu are all settings made.

Parameter	Range	Description	Default
Fan mode	Stopp Normal Forcerad Auto	Unit stopped Unit operates with SA and EA at normal speed Unit operates with SA and EA at forced speed Unit operates with fan speed according to time schedule	Stopp
Setp. Main	0-60°C	Main setpoint room/extract air or climate adapted control.	20°C
Setp. Supply air	0-60°C	Setpoint supply air temperature	20°C
Minv. Supply air	0-60°C	Minimum supply air temperature	16°C
Maxv. Supply air	0-60°C	Maximum supply air temperature	28°C
Alarm temp. fail	0-60°C	Deviation limit from setpoint for supply air temperature, a B-alarm is set up after more than 30 minutes deviation. An A-alarm is set up and unit stops if temperature drops more than 5° below low limit.	5°C
SA normal	0-100%	SA peed at normal speed	40%
EA normal	0-100%	EA peed at normal speed	40%
SA forced	0-100%	SA peed at forced speed	80%
EA forced	0-100%	EA peed at forced speed	80%
Outd. Temp fan normal	-30 - +30 °C	Fan speed limits to normal speed at outdoor temp. below set value. Climate adapted control: Low outdoor temperature, fan speed normal at and below this point. See fig.	-25°C 0°C
Outd. Temp fan forced	-30 - +30 °C	Only at Climate adapted control: High outdoor temperature, fan speed forced at and above this point. The point where controller shift between supply and extract air control See fig.	14°C
Outd comp summer Temp 1	-30 - +30 °C	Setpoint for start of summer compensation (at this point there is no compensation)	25°C
Outd comp summer Temp 2	-30 - +30 °C	Setpoint for full summer compensation (at this point compensation has is full influence on temp. control)	30°C
Outd comp summer Comp	-30 - +30 °C	The value that compensation would achieve at “Temp 2” summer.	0 °C
Outd comp winter Temp 1	-30 - +30 °C	Setpoint for full winter compensation (at this point compensation has is full influence on temp. control)	-20°C
Outd comp winter Temp 2	-30 - +30 °C	Setpoint for start of winter compensation (at this point there is no compensation)	+5°C
Outd comp winter Comp	-30 - +30 °C	The value that compensation would achieve at “Temp 1” winter.	0°C
DX cool start	0 – 100%	Switch on point. Visible only when Cool battery is selected as Installed.	20%
DX cool stop	0 – 100%	Switch off point. Visible only when Cool battery is selected as Installed.	5%

Menu – ”Settings”

Parameter	Range	Description	Default
Temp. pump stop	-30 - +30°C	Selection of outdoors temperature for start/stop of circulation-pump when configured as exercise	5°C
Setp. Freeze	0-60 °C	Setpoint for minimum water temperature at non operating unit (at operating unit the set point decreases with 13°).	25°C
Alarm Freeze	0-60 °C	The water temperature for a freeze alarm, an A-alarm is set up and the unit stops immediately.	7°C
Night cooling Interv.:	10-250 min	Delay before starting night cooling after end of daytime. Only when extract air temp. sensor is used.	240min
Night cooling Start:	0-60°C	Start and stop temperature night cooling. Start limit: room/extract air temp. >= Start Stop limit: room/extract air temp. <= Start –1°	24°C
Night heating Interv.:	10-250 min	Delay before starting night heating after end of daytime. Only when extract air temp. sensor is used.	240min
Night heating Start:	0-60°C	Start and stop temperature night cheating. Start limit: room/extract air temp. <= Start Stop limit: room/extract air temp. >= Start+1°	16°C
EA night heating	Start/Stop	Select if exhaust air fan is to be used at night heating.	Start
SA man.	0-100%	Supply air fan, manual overrun output-value	0%
EA man.	0-100%	Exhaust air fan, manual overrun output-value	0%
Rot. VVX man.	0-100%	Revolving heat recovery, manual overrun output-value	0%
H-valve man.	0-100%	Heater valve, manual overrun output-value	0%
C-valve man.	0-100%	Cooler valve, manual overrun output-value	0%
El heater man.	0-100%	Electrical heater, manual overrun output-value	0%
CP heat man.	0-100%	Circulation pump, manual overrun output-value	0%
CP cool man.	0-100%	Circulation pump, manual overrun output-value	0%
DX cool man.	0-100%	Circulation pump, manual overrun output-value	0%

8.4 Menu – ”Clock”

I denna meny ställs aktuell tid in och tidkanalen konfigureras.

Parameter	Range	Description	Default
Actual time	Time: 00:00-24:00 Day: 1-7	Actual day, hour and minute	__:__
Program. mode	D= 1-5, 6-7 D= 1,2,3,4,5,6,7	Group settings (workdays and weekend) Individual day settings	D= 1-5, 6-7
Day: X(-X) **Time:** X 00:00 **Mode:** Stop	Time: 00:00-23:30 Mode: Stop,normal,forc.	Setting of event time (hour or half-hour) for each day (four different) or each group (four different) and operating mode for each event. ▲-button or ▼-button to manoeuvre in time schedule.	Dag 1-5: 00:00 Stop 06:00 Normal 12:00 Normal 18:00 Stop Dag 6-7 00:00 Stop 06:00 Stop 12:00 Stop 18:00 Stop

9. Communication

IVC3 communicates by RS232 with a MODBUS-RTU protocol. (Separate manual).