Corrigo E - manual

Ventilation application

REGIN

THE CHALLENGER IN BUILDING AUTOMATION

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Table of contents

Chapter 1 About the manual

This manual covers all the models in the Corrigo E series used with the ventilation application. This revision covers program revisions from 3.0.

More information

More information about Corrigo E can be found in:

- ***Manual E tool*** – Manual on how to configure the controllers using the PC software E tool
- ***Lon-interface variable list*** – Variable list for the Corrigo E series
- ***Network variables for EXOline and Modbus*** – Variable list for EXOline and Modbus communication
- ***CE - Declaration of conformity, Corrigo E***

The information is available for download from Regin's homepage, www.regin.se.

Chapter 2 About Corrigo E

The Corrigo E series comprises three model sizes: 8, 15 or 28 in-/outputs.

In each model of Corrigo E generation 2, all applications are loaded in a separate memory area. The models have article number E...-S (where S stands for Second generation). From version 3.0, there are models with two communication ports. By connecting one/two expansion controllers to port two on these units, it is possible to increase the number of inputs and outputs. The 2-port Corrigo models have article number E...2-S (where the number two stands for 2 ports). For more detailed information, see chapter 17.

The controllers are available with or without front panel display and buttons. For units without front panel display and buttons a separate, cable-connected terminal E-DSP with display and buttons is available.

All programming and normal handling can be done using the display and buttons or from a connected computer running Corrigo E tool and using EXOline for communication.

News in version 3.0

- Possibility to connect expansion controllers. See chapter 17.
- Models with two ports that can control two VACON frequency converters via Modbus communication. See chapter 17 and section 16.26.2.
- Enthalpy control. See section 5.1.8.
- Updated function for free cooling. See section 5.1.6.
- Extra sequence output Y4. See sections 5.1 and 16.5.

Application choice

On delivery, the main memory in the Corrigo is empty. All the application programs that can be run in the Corrigo are located in a separate memory area.

On the first start-up, the controller will start a special program for downloading a suitable application and suitable languages to the main memory.

For certain customised models, an application has already been selected when the product is delivered. If so, the selected application will be started immediately.

```
Corrigo E Controller
 08:01:01   00:00
Select application
with down arrow
```

First press OK to set the date and time. Use the up and down arrows to change values and the right and left arrows to move between fields. When the date has been set, press OK and the cursor will move to the scheduler. Set the time in the same way as the date and press OK to confirm.

Then press OK to confirm.

```
->Ventilation
  Heating
  Boiler
  Expansion Unit 1
  Expansion Unit 2
```

Use the up and down arrows to move the cursor in the left edge of the display to the application you wish to load. Press right arrow to choose the selected application and go to Language choice.

```
Ventilation
Choose language
English
Accept changes:No
```

Press OK to choose language. Use the up and down arrows to move between languages and press OK to confirm your choice.

When another language than English is chosen, both English and the selected language will be loaded.

To make the final confirmation of the created programs and language choices, change No to Yes and confirm by pressing OK.

After a few seconds, the display will show a start display in English for the chosen application. After another few seconds, the display text will change to the selected language, if another language than English has been selected.

```
Regulator vent. sys
 08:06:03   09:32
System:Stopped
Sp: 19.5 Act: 20.1°C
```

Ventilation application

The temperature controller is based on a supply air PI-controller for heating control with a pre-programmed set of control modes. To this controller can be bound a number of different control functions and analogue and digital input and output functions. The choice of which functions are to be used is free, the only restriction is the physical number of inputs and outputs of the different models. The maximum number of I/Os is 3*28 (a 2-port Corrigo with two expansion controllers).

The Corrigo is designed for DIN-rail mounting.

The program for an air handling unit contains, apart from other things, the following functions:

Different temperature control modes

Supply air temperature control, with or without outdoor temperature compensation

Room temperature control (cascade controller)

Extract air temperature control (cascade controller).

Seasonal switching between supply air temperature control and room/extract air temperature control.

Extra, separate temperature control circuit for after-heaters etc.

With control of:

Heat exchanger (Liquid connected- , plate- or rotating) or mixing dampers.

Heating coil; Water with frost protection or electric.

Chiller water-heated or DX, up to 3 steps.

Circulation pumps heating, cooling, exchanger.

Fan control

1- or 2-speed supply air fans and extract air fans.

Frequency controlled supply and extract air fans with pressure or flow control, manual control or external control from a VAV system. Pressure controlled supply air fan with slave connected extract air fan (output dependent or flow dependent).

Humidity control

Either Humidification or Dehumidification or both Humidification and Dehumidification.

Timer control

For starting and stopping the unit. Up to 5 timer outputs for control of external functions such as lighting, doorlocks etc.

Demand control

In buildings with strongly varying occupancy the fan speeds or mixing dampers can be controlled by the air quality measured by a CO_2/VOC sensor.

Support control

When using the control function room control or extract air temperature control, it is possible to utilise support-heating and/or support-cooling. Minimum running time is settable 0…720 minutes. (factory setting 20 minutes).

Free cooling

The function is used during the summer to cool the building during the night using cool outdoor air thereby reducing the need to run chillers during the day. The function can also be activated during the day if the temperature permits it.

Enthalpy control for free cooling/heating

This function is used to override the mixing dampers to increase the recirculation, depending on the result of the enthalpy calculation.

Cooling recovery

If the extract air is colder than the outdoor air and cooling is required, the heat exchanger control is reversed in order to return the cool extract air.

Recirculation control

Recirculation of air using a supply air fan and recirculation damper, with or without temperature control.

Step controllers Heating/Cooling

As an alternative to the analogue control of ”Actuator heating Y1” or ”Actuator cooling Y3” step controllers can be used for controlling heating or cooling in steps using digital control.

Corrigo E hardware overview

Model	8	8D	15	15D	28	28D
Analogue Inputs	2	2	4	4	4	4
Digital Inputs	3	3	4	4	8	8
Universal Inputs	-	-	-	-	4	4
Analogue Outputs	1	1	3	3	5	5
Digital Outputs	2	2	4	4	7	7
RS485*	Yes	Yes	Yes	Yes	Yes	Yes
LON	Option	Option	Option	Option	Option	Option
WEB (TCP/IP)	Option	Option	Option	Option	Option	Option
2-port	No	No	Option	Option	Option	Option
Display	No	Yes	No	Yes	No	Yes
Ext. display	Option	No	Option	No	Option	No

*Communication port RS485 is not available for option WEB (TCP/IP). However, a 2-port Corrigo with TCP/IP and RS485 can be selected, where RS485 is used for expansion controllers.

Corrigo E model overview

Model with display	Model without display	Description
E8D-S, E15D-S, E28D-S	E8-S, E15-S, E28-S	Standard controller with RS485 port
E8D-S-LON, E15D-S-LON, E28D-S-LON	E8-S-LON, E15-S-LON, E28-S-LON	Controller with both LON and RS485 ports
E8D-S-WEB, E15D-S-WEB, E28D-S-WEB	E8-S-WEB, E15-S-WEB. E28-S-WEB	Controller with TCP/IP port and built-in webserver
E152D-S, E282D-S	E152-S. E282-S	Controller with two RS485 ports for connection of expansion units
E152D-S-WEB, E282D-S-WEB	E152-S-WEB, E282-S-WEB	Controller with RS485 port and built-in webserver. For connection of expansion units.

Technical data

Protection class IP20
Display..... 4 rows of 20 characters. Background illumination.
LEDs
  Yellow ..... Settable parameter
  Red..... Alarm indication
Clock ..... Year base 24 hour clock with battery backup.
Automatic summer-/winter-time changeover.
Operating system ..... EXOreal
Supply voltage..... 24 V AC ±15%, 50…60 Hz or 20…36 V DC
Power consumption ..... 5 VA, 3 W (DC), model WEB: 9 VA, 5 W (DC)
Dimensions..... 148x123x60 (WxHxD incl. terminals)
Casing..... Standard Euronorm (8.5 modules wide)
Mounting ..... On DIN-rail
Operation
  Climatic conditions according to IEC 721-3-3 ..... Class 3k5
  Ambient temperature ..... 0...50°C
  Ambient humidity..... Max 95% RH
  Mechanical requirements according to IEC721-3-3 ..... Class 3M3
  Vibration..... IEC60068-2-6, Test FC, vibration Sinusoidal
  Shock ..... IEC60068-2-27, Test Ea
Transport
  Climatic conditions according to IEC 721-3-2 ..... Class 2k3
  Ambient temperature ..... -20...70°C
  Ambient humidity..... Max 95% RH
  Mechanical requirements according to IEC721-3-2 ..... Class 2M2
  Vibration..... IEC60068-2-6, Test FC, vibration Sinusoidal
  Shock ..... IEC60068-2-27, Test Ea
  Free fall..... IEC60068-2-27, Test Ed
Storage
  Climatic conditions according to IEC 721-3-1 ..... Class 1k3
  Ambient temperature ..... -20...70°C
  Ambient humidity..... Max 95% RH

Battery

Type..... Replaceable Lithium cell, CR2032
Battery life ..... Better than 5 years
Warning ..... Low battery warning
Battery backup..... Memory and real time clock

Communication

EXOline Port 1, insulated via a built-in RS485 contact.
EXOline Port 2, insulated via a built-in RS485 contact (only 2-port Corrigo models).
The basic version of Corrigo E can communicate with Modbus. You do not need an activation code.
Corrigo E can be ordered with a communication port for TCP/IP or LON.

CE-marking

Conforms with the EMC standards: CENELEC EN61000-6-3:2001, CENELEC EN61000-6-1:2001.

Inputs

Analogue inputs AI..... Settable 0…10 V DC or PT1000, 12 bit A/D
Digital inputs DI ..... Potential free closure
Universal inputs UI..... Can be set to act as either an analogue input or
..... a digital input with specifications as above

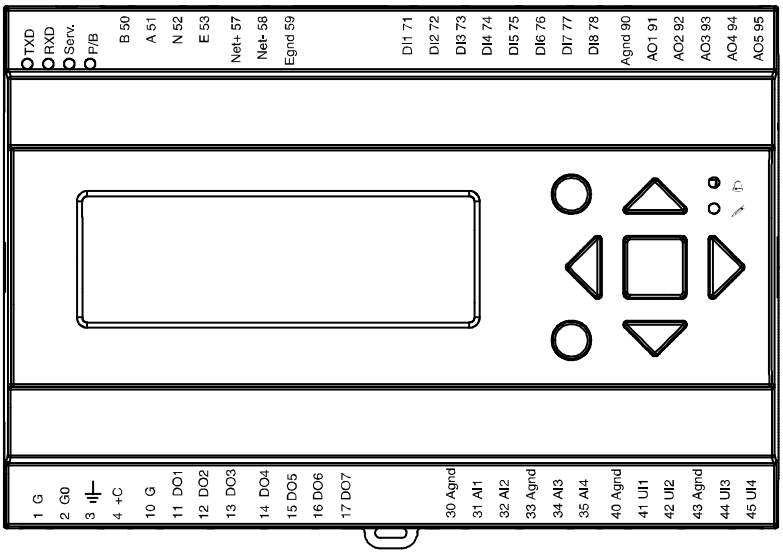
Outputs

Analogue outputs AO ..... Configurable 0…10 V DC; 2…10 V DC;
..... 10…0 V DC or 10…2 V DC
..... 8 bit D/A short-circuit protected
Digital outputs DO ..... Mosfet outputs, 24 V AC/DC, 2 A continuous. Totally max 8 A.

Options

LON..... FT3150, gives a second communication route
WEB (TCP/IP port) ..... Replaces RS485 for EXOline (Port 1) communication
2-port Corrigo models ..... Two serial ports or one serial port and one TCP/IP port
External hand terminal, E-DSP ..... For use with Corrigo E units without display

Position of the terminals on Corrigo E



Chapter 3 **Installation and wiring**

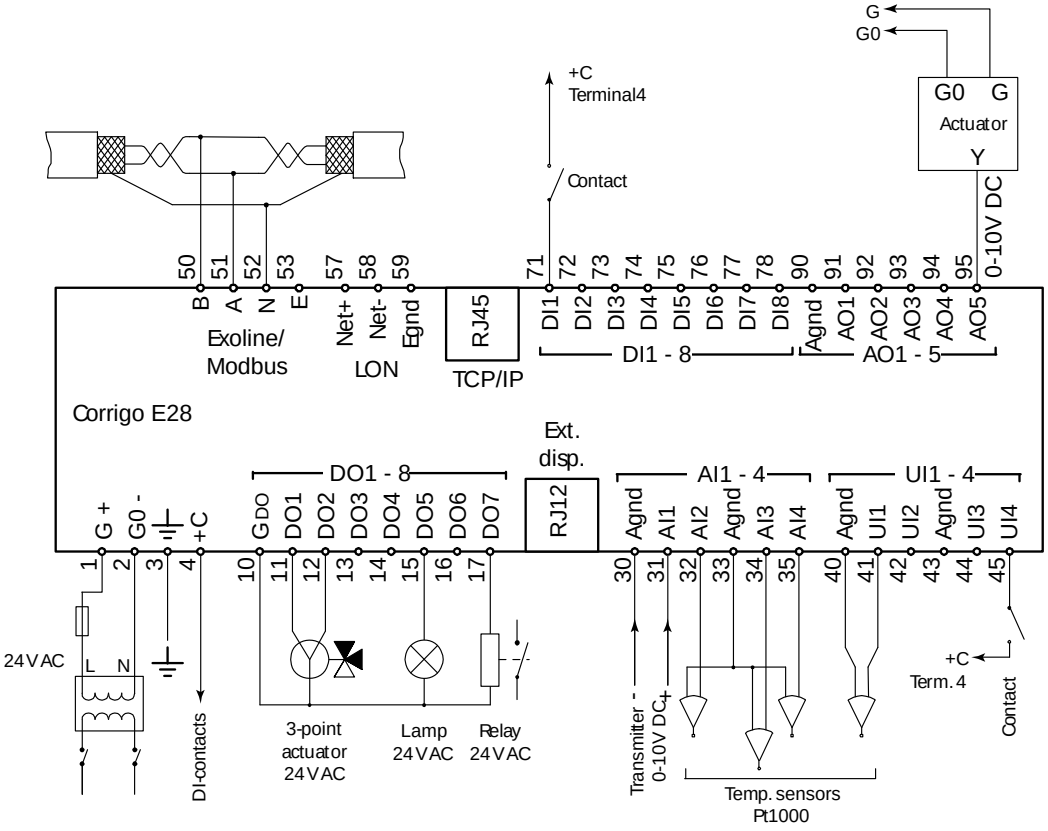
3.1 Installation

Corrigo E can be mounted in a DIN-standard casing (minimum 9 modules), on a DIN-rail in a cabinet or, using a suitable front-mounting kit, in a cabinet door or other control panel.

Ambient temperature: 0…50°C.

Ambient humidity: max. 95 %RH, non-condensing.

The picture below shows a wiring example for Corrigo E28.



3.2 Wiring

At the end of this chapter there are wiring diagrams showing the factory set configuration. We have also included blank diagrams. Since the function of most of the inputs and outputs depends on the programming of the unit the final wiring diagram cannot be filled in until the installer has decided how to use the inputs/outputs. It is important to make sure that the wiring is correctly done and in accordance with the instructions given in this manual.

3.2.1 Supply voltage

24 V AC ±15%, 50…60 Hz or 20…36 V DC

If the Corrigo E and the actuators connected to it share the same transformer it is essential that the same transformer-pole is used as reference for all the equipment. Failure to do so will prevent the equipment from functioning as intended and may also lead to damages.

3.2.2 Inputs and outputs

The list of input and output functions in section 3.2.3 is a handy instrument to help you keep track of which inputs and outputs you will need to configure.

Analogue inputs

Analogue inputs must refer to an Agnd terminal placed in the same terminal block as the input being wired.

Analogue inputs can, depending on the configuration, be used for either PT1000 temperature sensors or for 0…10 V DC analogue input signals, for example from a pressure transmitter.

Digital inputs

Digital inputs must refer to C+ on terminal 4. Digital inputs may only be wired to voltage-free contacts. Any external voltage applied to a digital input may harm the unit. The input signal can be set to either NO or NC.

Universal inputs

A universal input can be configured to act as either an analogue input or as a digital input.

A universal inputs configured as an analogue input can, depending on the configuration, be used for either PT1000 temperature sensors or for 0…10 V DC analogue input signals, for example from a pressure transmitter.

Universal inputs configured as an analogue input must refer to an Agnd terminal placed in the same terminal block as the input being wired.

A universal input configured as a digital input must, just like other digital inputs refer to C+ on terminal 4. It may only be wired to voltage-free contacts.

Analogue outputs

Analogue outputs must refer to the Agnd terminal placed in the AO terminal block.

All analogue outputs can be individually set to any one of the following signals:

0…10 V DC

2…10 V DC

10…0 V DC

10…2 V DC

If the Corrigo E and the actuators connected to it share the same transformer it is essential that the same transformer-pole is used as reference for all the equipment. Failure to do so will prevent the equipment from functioning as intended and may also lead to damages.

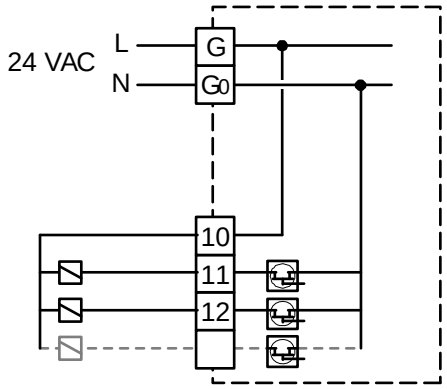
Digital outputs

Digital outputs should normally refer to G_{DO} on terminal 10. G_{DO} is internally connected to G on terminal 1 and supplies 24 V AC or DC depending on the choice of supply voltage.

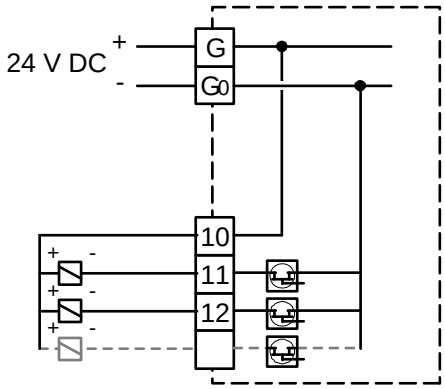
All the digital outputs are controlled by mosfet transistors. The outputs are internally connected with G_0 and can deliver max 2 A per output. However, the total power for all the DOs must not be over 8 A.

A number of different wiring alternatives are possible depending on the type of supply voltage to the Corrigo and the relay type.

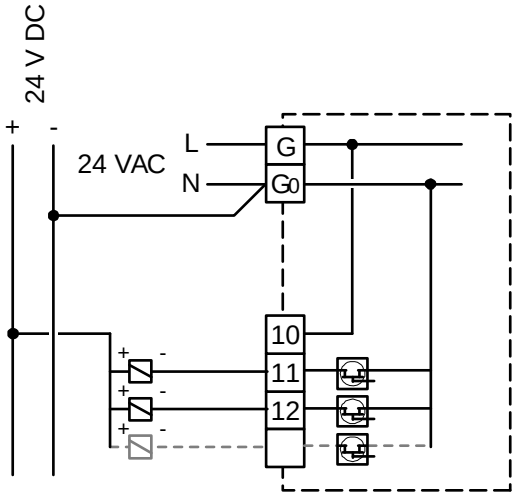
24 V AC supply and 24 V AC relays



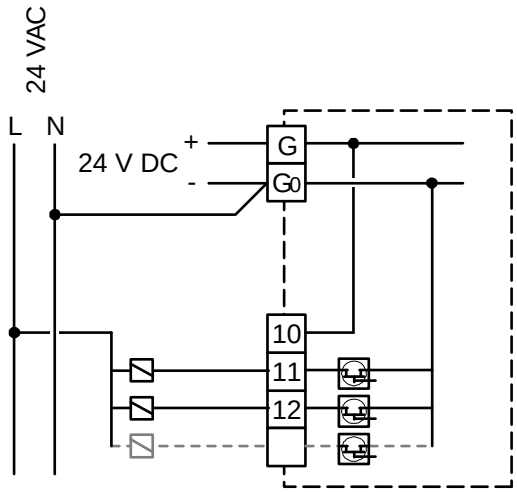
24 V DC supply and 24 V DC relays



24 V AC supply and 24 V DC relays



24 V DC supply and 24 V AC relays



3.2.3 Input and output lists

Use these lists during commissioning to help you keep track of which input and output functions you wish to use.

Analogue inputs

✓	Analogue input signal
	Outdoor temperature sensor
	Supply air temperature sensor
	Extract air temperature sensor
	Extract air temperature sensor
	Room temperature sensor 1
	Room temperature sensor 2
	CO_2 sensor, 0…10 V DC
	Extra sensor / Setpoint potentiometer
	Pressure transmitter, supply air 0…10 V DC
	Pressure transmitter, extract air 0…10 V DC
	De-icing sensor, heat exchanger
	Frost protection sensor
	Room humidity sensor
	Duct humidity sensor
	Outdoor humidity sensor
	Temperature sensor, Extra controller
	External control Supply air fan
	External control Extract air fan
	Pressure transmitter Supply air 2

Digital inputs

✓	Digital input signal
	Filter guard, supply air and extract air
	Run-indication/alarm circulation pump, heating
	Run-indication/alarm circulation pump, cooling
	Run-indication/alarm circulation pump, exchanger
	Fire alarm
	Fire damper end-switch monitoring
	Extended running normal
	Extended running reduced
	External stop
	External alarm
	Flow guard
	Rotation sentinel, exchanger
	Run-indication/alarm supply air fan
	Run-indication/alarm extract air fan
	De-icing, exchanger
	Frost protection thermostat
	High temp. limit switch
	Recirculation start
	Change-over

The universal inputs on Corrigo E28 can, individually, be configured as either analogue inputs using any of the analogue input signals above or as digital inputs using any of the digital inputs above.

Analogue outputs

✓	Analogue output signal
	Y1 Actuator Heating
	Y2 Actuator Exchanger
	Y3 Actuator Cooling
	Frequency converter, supply air fan
	Frequency converter, extract air fan
	Actuator Humidity control
	Split of any one of temp outputs Y1, Y2 or Y3
	Extra controller
	Y1 Heating / Y3 Cooling, Change-over output
	Y4 Extra Sequence

Digital outputs

✓	Digital output signal
	Start/stop Supply air fan Normal
	Start/stop Extract air fan Normal
	Start/stop Supply air fan Reduced
	Start/stop Extract air fan Reduced
	Start/stop circulation pump, heating
	Fire dampers
	Sum alarm A- and B-alarm
	Sum alarm A-alarm
	Sum alarm B-alarm
	Start/stop circulation pump, cooling
	Start/stop circulation pump, liquid exchanger
	Activation-signal SAF frequency converter
	Activation-signal EAF frequency converter
	Heating activate
	Cooling activate
	Exchanger activate
	Extract air close-off damper
	Fresh air close-off damper
	Recirculation damper
	Heating 3-pos. actuator, increase
	Heating 3-pos. actuator, decrease
	Exchanger 3-pos. actuator, increase
	Exchanger 3-pos. actuator, decrease
	Cooling 3-pos. actuator, increase
	Cooling 3-pos. actuator, decrease
	Step controller heating, step 1
	Step controller heating, step 2
	Step controller heating, step 3
	Step controller heating, step 4
	Step controller cooling, step 1
	Step controller cooling, step 2
	Step controller cooling, step 3
	Extra Timer channel 1
	Extra Timer channel 2
	Extra Timer channel 3
	Extra Timer channel 4
	Extra Timer channel 5
	Humidity
	External controller active
	Heating/Cooling 1
	Heating/Cooling 2
	Heating/Cooling 3
	Free cooling

Wiring diagram Corrigo E28-S factory configuration

(See also the picture of the position of the terminals on page 8)

1	G	Supply voltage 24 V AC or 24 V DC, ±15%. 50/60 Hz
2	G0	
3		Protective earth
4	+C	+24 V DC. Reference for digital inputs DI.

50	B	RS485 EXOline / Modbus (not in WEB (TCP/IP) models)
51	A	
52	N	
53	E	

10	G_{DO}	Reference for digital outputs DO.
11	DO1	Start/stop supply air fan (SAF) 1/1-speed
12	DO2	Start/stop extract air fan (EAF) 1/1-speed
13	DO3	Start/stop supply air fan (SAF) 1/2-speed
14	DO4	Start/stop extract air fan (EAF) 1/2-speed
15	DO5	Start/stop Circulation pump, Heating
16	DO6	Fire dampers
17	DO7	Sum alarm A + B

57	Net+	LON-connection (LON-versions only)
58	Net-	
59	Egnd	

30	Agnd	Reference pole for analogue inputs AI
31	AI1	Outdoor temperature sensor
32	AI2	Supply air temperature sensor
33	Agnd	Reference pole for analogue inputs AI
34	AI3	Extract air temperature sensor
35	AI4	Room temperature sensor 1

71	DI1	Filter guard, supply air and extract air
72	DI2	Run indication /alarm, Circ. pump Heating
73	DI3	Run indication /alarm, Circ. pump Cooling
74	DI4	Fire alarm
75	DI5	Fire damper end-switch monitoring
76	DI6	Extended running 1/1-speed
77	DI7	External alarm
78	DI8	External stop

40	Agnd	Reference pole for universal inputs UI
41	UI1	DI Run indication / Motor protection SAF
42	UI2	DI Run indication / Motor protection EAF
43	Agnd	Reference pole for universal inputs UI
44	UI3	De-icing sensor, heat exchanger
45	UI4	Frost protection sensor

90	Agnd	Reference pole for analogue outputs AO
91	AO1	Y1 Actuator Heating
92	AO2	Y2 Actuator Exchanger
93	AO3	Y3 Actuator Cooling
94	AO4	Not used
95	AO5	Not used

Wiring diagram Corrigo E15-S factory configuration

1	G	Supply voltage 24 V AC or 24 V DC, ±15%. 50/60 Hz
2	G0	
3		Protective earth
4	+C	+24 V DC. Reference for digital inputs DI.

50	B	RS485 EXOline / Modbus (not in WEB (TCP/IP) models)
51	A	
52	N	
53	E	

10	G_{DO}	Reference for digital outputs DO.
11	DO1	Start/stop supply air fan (SAF) 1/1-speed
12	DO2	Start/stop extract air fan (EAF) 1/1-speed
13	DO3	Start/stop Circulation pump, Heating
14	DO4	Sum alarm A + B

57	Net+	LON-connection (LON-versions only)
58	Net-	
59	Egnd	

30	Agnd	Reference pole for analogue inputs AI
31	AI1	Outdoor temperature sensor
32	AI2	Supply air temperature sensor
33	Agnd	Reference pole for analogue inputs AI
34	AI3	Frost protection sensor
35	AI4	Room temperature sensor 1

71	DI1	Run indication / Motor protection SAF
72	DI2	Run indication / Motor protection EAF
73	DI3	Run indication /alarm, Circ. pump Heating
74	DI4	Extended running

90	Agnd	Reference pole for analogue outputs AO
91	AO1	Y1 Actuator Heating
92	AO2	Y2 Actuator Exchanger
93	AO3	Y3 Actuator Cooling

Wiring diagram Corrigo E8-S factory configuration

1	G	Supply voltage 24 V AC or 24 V DC, ±15%. 50/60 Hz
2	G0	
3		Protective earth
4	+C	+24 V DC. Reference for digital inputs DI.

50	B	RS485 EXOline / Modbus (not in WEB (TCP/IP) models)
51	A	
52	N	
53	E	

10	G_{DO}	Reference for digital outputs DO.
11	DO1	Start/stop supply air fan (SAF) 1/1-speed
12	DO2	Start/stop Circulation pump, Heating

57	Net+	LON-connection (LON-versions only)
58	Net-	
59	Egnd	

30	Agnd	Reference pole for analogue inputs AI
31	AI1	Outdoor temperature sensor
32	AI2	Supply air temperature sensor

71	DI1	Run indication / Motor protection SAF
72	DI2	Run indication /alarm, Circ. pump Heating
73	DI3	High temp. limit switch / Frost prot. thermostat

90	Agnd	Reference pole for analogue outputs AO
91	AO1	Y1 Actuator Heating

Empty wiring diagram Corrigo E28-S

1	G	Supply voltage 24 V AC or 24 V DC, ±15%. 50/60 Hz
2	G0	
3		Protective earth
4	+C	+24 V DC. Reference for digital inputs DI.

50	B	RS485 EXOline / Modbus (not in WEB (TCP/IP) models)
51	A	
52	N	
53	E	

10	G_{DO}	Reference for digital outputs DO.
11	DO1	
12	DO2	
13	DO3	
14	DO4	
15	DO5	
16	DO6	
17	DO7	

57	Net+	LON-connection (LON-versions only)
58	Net-	
59	Egnd	

30	Agnd	Reference pole for analogue inputs AI
31	AI1	
32	AI2	
33	Agnd	Reference pole for analogue inputs AI
34	AI3	
35	AI4	

71	DI1	
72	DI2	
73	DI3	
74	DI4	
75	DI5	
76	DI6	
77	DI7	
78	DI8	

40	Agnd	Reference pole for universal inputs UI
41	UI1	
42	UI2	
43	Agnd	Reference pole for universal inputs UI
44	UI3	
45	UI4	

90	Agnd	Reference pole for analogue outputs AO
91	AO1	
92	AO2	
93	AO3	
94	AO4	
95	AO5	

Empty wiring diagram Corrigo E15-S

1	G	Supply voltage 24 V AC or 24 V DC, ±15%. 50/60 Hz
2	G0	
3		Protective earth
4	+C	+24 V DC. Reference for digital inputs DI.

50	B	RS485 EXOline / Modbus (not in WEB (TCP/IP) models)
51	A	
52	N	
53	E	

10	G_{DO}	Reference for digital outputs DO.
11	DO1	
12	DO2	
13	DO3	
14	DO4	

57	Net+	LON-connection (LON-versions only)
58	Net-	
59	Egnd	

71	DI1	
72	DI2	
73	DI3	
74	DI4	

30	Agnd	Reference pole for analogue inputs AI
31	AI1	
32	AI2	
33	Agnd	Reference pole for analogue inputs AI
34	AI3	
35	AI4	

90	Agnd	Reference pole for analogue outputs AO
91	AO1	
92	AO2	
93	AO3	

Empty wiring diagram Corrigo E28-S

1	G	Supply voltage 24 V AC or 24 V DC, ±15%. 50/60 Hz
2	G0	
3		Protective earth
4	+C	+24 V DC. Reference for digital inputs DI.

50	B	RS485 EXOline / Modbus (not in WEB (TCP/IP) models)
51	A	
52	N	
53	E	

10	G_{DO}	Reference for digital outputs DO.
11	DO1	
12	DO2	

57	Net+	LON-connection (LON-versions only)
58	Net-	
59	Egnd	

30	Agnd	Reference pole for analogue inputs AI
31	AI1	
32	AI2	

71	DI1	
72	DI2	
73	DI3	

90	Agnd	Reference pole for analogue outputs AO
91	AO1	

Empty wiring diagram Corrigo E282-S

1	G	Supply voltage 24 V AC or 24 V DC, ±15%. 50/60 Hz
2	G0	
3		Protective earth
4	+C	+24 V DC. Reference for digital inputs DI.

10	G_{DO}	Reference for digital outputs DO.
11	DO1	
12	DO2	
13	DO3	
14	DO4	
15	DO5	
16	DO6	
17	DO7	

30	Agnd	Reference pole for analogue inputs AI
31	AI1	
32	AI2	
33	Agnd	Reference pole for analogue inputs AI
34	AI3	
35	AI4	

40	Agnd	Reference pole for universal inputs UI
41	UI1	
42	UI2	
43	Agnd	Reference pole for universal inputs UI
44	UI3	
45	UI4	

50	B	RS485 EXOline / Modbus (Port 1)
51	A	
52	N	
53	E	
54	B	RS485 EXOline / Modbus (Port 2)
55	A	
56	N	
57	E	

71	DI1	
72	DI2	
73	DI3	
74	DI4	
75	DI5	
76	DI6	
77	DI7	
78	DI8	

90	Agnd	Reference pole for analogue outputs AO
91	AO1	
92	AO2	
93	AO3	
94	AO4	
95	AO5	

Empty wiring diagram Corrigo E152-S

1	G	Supply voltage 24 V AC or 24 V DC, ±15%. 50/60 Hz
2	G0	
3		Protective earth
4	+C	+24 V DC. Reference for digital inputs DI.

10	G_{DO}	Reference for digital outputs DO.
11	DO1	
12	DO2	
13	DO3	
14	DO4	

30	Agnd	Reference pole for analogue inputs AI
31	AI1	
32	AI2	
33	Agnd	Reference pole for analogue inputs AI
34	AI3	
35	AI4	

50	B	RS485 EXOline / Modbus (Port 1)
51	A	
52	N	
53	E	
54	B	RS485 EXOline / Modbus (Port 2)
55	A	
56	N	
57	E	

71	DI1	
72	DI2	
73	DI3	
74	DI4	

90	Agnd	Reference pole for analogue outputs AO
91	AO1	
92	AO2	
93	AO3	

Chapter 4 **Commissioning**

General

Before the Corrigo can be used it must be configured, inputs and outputs must be assigned and all relevant parameters must be set.

All commissioning can be done using the Corrigo front panel display and buttons or using the display unit E-DSP.

Corrigo E tool

The best way however, is to configure the Corrigo E by using Corrigo E tool.

Corrigo E tool is a PC-based configuration program specially developed to simplify the commissioning of the Corrigo E series.

When using E tool the whole configuration and all settings can be done on the computer and then be downloaded to the Corrigo. An infinite number of different configurations can be saved in computer memory for later use.

4.1 How to do it

For configuration using E tool, see the E tool manual.

For configuration using the front panel there are two ways to go depending on how much help you need.

Option 1:

- Jump straight to chapter 7 and 8, *Display, LEDs and buttons* and *Access rights*.
- After mastering the button and menu system, connect power to your Corrigo, log on at System level and go to the menu Configuration.
- For the time being, skip the configuration menu Inputs/Outputs and start by configuring Control functions.
- Run through the configuration menus in order and set whatever functions and parameters you wish to include. Use chapter 6 of this manual for reference. Keep track of which inputs and outputs you will need. To help you, there is a list of input and output functions provided in chapter 3, (3.2.3 Input / Output list.)
- Finally, configure Inputs/Outputs.
- Exit Configuration and go to Settings
- Set the control values in Settings
- Set the clock and scheduler functions in Time Settings.
- Set the control setpoints in Temperature and Air control as well as in Humidity control if humidity control has been configured

Your Corrigo should now be ready to run.

Option 2:

Read this manual in the order given below: The manual has been designed to act as a guide through the commissioning. The last chapters of the manual, not listed below, cover menus and functions that are not used during commissioning.

Functional description

Start by reading chapter 5. *Functional description* below. Some functions are essential to the working of the unit and must be included. Others are more of the nature of optional extras which can be excluded.

At the end of each function description there is a table of the necessary inputs and outputs to implement the function. At the end of the manual there is a list of all the analogue and digital inputs and outputs. As you read, mark in the list the inputs and outputs you will be using for the application you are building. Note that the universal inputs in Corrigo E28 can, individually, be configured as either analogue or digital inputs.

Display, buttons and LEDs

Read chapter 7 on how to use the front panel buttons to navigate the Corrigo E menu system.

Access rights

Chapter 8. Learn how to log on to the Corrigo E

Configuration

Chapter 16. Configuration.

Connect power to the Corrigo. Using the buttons and menu system, go through the configuration menus covering the functions you wish to use.

On delivery the units already have the inputs and outputs assigned to various functions. These can, of course, be changed. In chapter 3 *Installation and wiring* there are two sets of wiring diagrams, one set showing the pre-configured input / output configuration and one set where you can fill your own configuration choices.

Settings

Chapter 15

Set the control parameters, P-band, I-time for the temperature control.

Set the control parameters for the pressure control if you have pressure- or flow- controlled fans.

Set the control parameters for the humidity control if activated.

Set the alarm parameters; alarm levels and delay times.

Time settings

Chapter 13

Set the clock and calendar functions.

Setpoints

Chapters 10, 11 and 12:

Set all the setpoints for all active control loops.

Manual / Auto

Chapter 14

Learn to use manual control. Very useful for testing out your system.

Other functions

Chapter 18

Alarm handling etc.

Chapter 5 **Functional description**

5.1 Temperature control

General

Corrigo E has a choice of the following control modes:

1. Supply air control
2. Outdoor temperature compensated supply air control
3. Cascaded room temperature control
4. Cascaded extract air temperature control
5. Outdoor temperature dependent switching between room control and supply air control
6. Outdoor temperature dependent switching between extract air control and supply air control

The supply air temperature controller is reverse acting, i. e. the output will increase for decreasing temperature. The controller is a PI-controller with settable P-band and I-time.

In the first two modes the supply air temperature will be controlled using the supply air temperature and the user setpoint values as control inputs.

In modes 3 and 4 the supply air is controlled as part of a cascade controller together with the room/extract temperature controller. The room/extract temperature offset will dictate the supply air temperature setpoint.

Mode 5 and 6 vary according to the outdoor temperature: Supply air control in winter and cascaded room control or cascaded extract air control in summer.

In applications with mixing dampers instead of heat exchanger the signal for the damper control will be reversed compared to the signal for heat exchanger control i. e. decreasing signal on increasing heat demand. This is done automatically on configuring the exchanger output = dampers.

The heater can be either a hot water heater battery or an electric heater.

Outputs

The supply air controller output is split between one or more of the output blocks Y1, Y2 and Y3 for heating, heat exchanger and cooling. Each of these output blocks can be bound to either an analogue 0…10 V DC output or to two digital 3-position increase/decrease outputs.

Each output block has two parameters for setting the control range:

Heating Controller Output signal (HCOut) at which the output should be 0%

Heating Controller Output signal (HCOut) at which the output should be 100%

These settings are used to establish the output activation order and to split the P-band between the outputs.

Example:

0% Cooling at HCOut = 30%

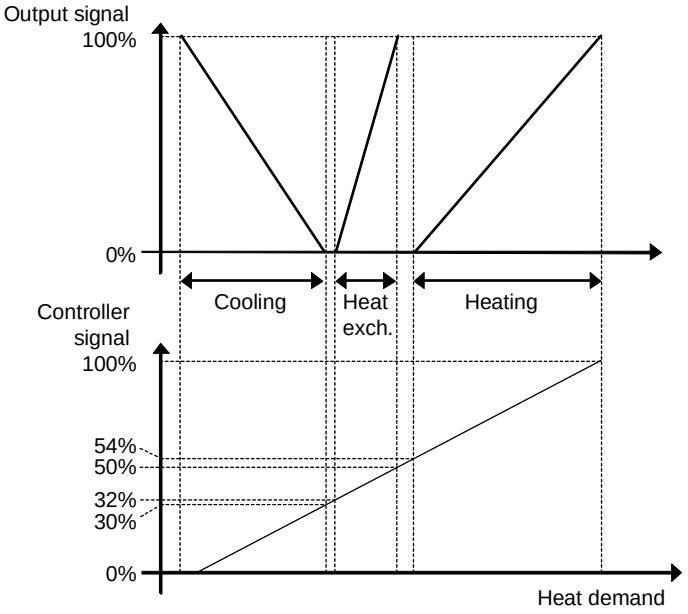
100% Cooling at HCOut = 0%

0% Heat exch. at HCOut = 32%

100% Heat exch. at HCOut = 50%

0% Heating at HCOut = 54%

100% Heating at HCOut = 100%



In addition to these three, it is possible to connect another anologue output signal for control of an optional sequence, Y4 Extra sequence. Y4 Extra sequence is set in the same way as above. You can also decide whether you want the output to be affected by the enthalpy control and/or the cooling recovery.

0% at HCOut = 0%

100% at HCOut = 0%

It is also possible to split one of the three analogue outputs heating, heat exchanger or cooling into two equal parts to give a fourth output sequence for temperature control.

5.1.1 Control modes

1. Supply air control

The supply air temperature is kept at the setpoint value by controlling the output signals for Y1 Heating, Y2 Heat exchanger, Y3 Cooling and Y4 Extra sequence. A single PI control loop is used.

The setpoint value is set using the front panel or alternatively using an external setpoint device.

Alarms for high and low supply air temperature are active.

Alarm for control offset of the supply air temperature is active.

2. Outdoor temperature compensated supply air control

The supply air temperature setpoint is outdoor temperature compensated using a control curve with 6 node points.

The supply air temperature is kept at the setpoint value by controlling the output signals for Y1 Heating, Y2 Heat exchanger, Y3 Cooling and Y4 Extra sequence. A single PI control loop is used.

Alarms for high and low supply air temperature are active.

Alarm for control offset of the supply air temperature is active.

3. Cascaded room temperature control.

Cascade control of room temperature and supply air temperature to achieve a constant, settable room temperature. The room controller output signal generates the supply air controller's setpoint value.

One or two room sensors can be connected. If two sensors are connected the average of their values will be used. The number of room sensors is detected automatically. The room temperature is kept at the setpoint value by controlling the output signals for Y1 Heating, Y2 Heat exchanger, Y3 Cooling and Y4 Extra sequence. Two PI loops are used.

The room setpoint value is set using the front panel or alternatively using an external setpoint device.

4. Cascaded extract air temperature control

Cascade control of extract air temperature and supply air temperature to achieve a constant, settable room temperature. The extract air controller output signal generates the supply air controller's setpoint value.

The extract air temperature is kept at the setpoint value by controlling the output signals for Y1 Heating, Y2 Heat exchanger, Y3 Cooling and Y4 Extra sequence. Two PI loops are used.

The extract air setpoint value is set using the front panel or alternatively using an external setpoint device.

5. Outdoor temperature dependent switching between supply air temperature control and room temperature control

When the outdoor temperature is lower than a settable limit (winter), outdoor compensated supply air temperature control will be active, otherwise (summer) cascaded room temperature control.

6. Outdoor temperature dependent switching between supply air temperature control and extract air temperature control

When the outdoor temperature is lower than a settable limit, outdoor compensated supply air temperature control will be active, otherwise cascaded extract air temperature control.

Inputs and outputs

1	2	3	4	5	6	Control modes
AI	**AI**	**AI**	**AI**	**AI**	**AI**	Supply air sensor
	AI			**AI**	**AI**	Outdoor temperature sensor
		AI		**AI**		Room temperature sensor(s)
			AI		**AI**	Exhaust air sensor
AO	**AO**	**AO**	**AO**	**AO**	**AO**	Y1 Heating 0…10 V DC **
AO	**AO**	**AO**	**AO**	**AO**	**AO**	Y2 Exchanger 0…10 V DC **
AO	**AO**	**AO**	**AO**	**AO**	**AO**	Y3 Cooling 0…10 V DC **
AO	**AO**	**AO**	**AO**	**AO**	**AO**	Y4 Extra sequence 0...10 V DC
AO	**AO**	**AO**	**AO**	**AO**	**AO**	Extra split Y1, Y2 or Y3 0…10 V DC (optional)
AO	**AO**	**AO**	**AO**	**AO**	**AO**	Y1 Heating/Y3 Cooling Change-over (option)
DO	**DO**	**DO**	**DO**	**DO**	**DO**	Heating 3-pos. increase **
DO	**DO**	**DO**	**DO**	**DO**	**DO**	Heating 3-pos. decrease **
DO	**DO**	**DO**	**DO**	**DO**	**DO**	Exch. 3-pos. Increase **
DO	**DO**	**DO**	**DO**	**DO**	**DO**	Exch. 3-pos. decrease **
DO	**DO**	**DO**	**DO**	**DO**	**DO**	Cooling 3-pos. increase **
DO	**DO**	**DO**	**DO**	**DO**	**DO**	Cooling 3-pos. decrease **

** Choose output type depending on the actuator type: Either AO 0…10V or DO 3-position increase/decrease.

5.1.2 Heater types

5.1.2.1 Water heating

Control

When the unit is in running mode the heating valve is controlled by the analogue output ”Y1 Heating” or by two digital outputs “Heating 3-pos. actuator, increase” and “Heating, 3-pos. actuator, decrease”.

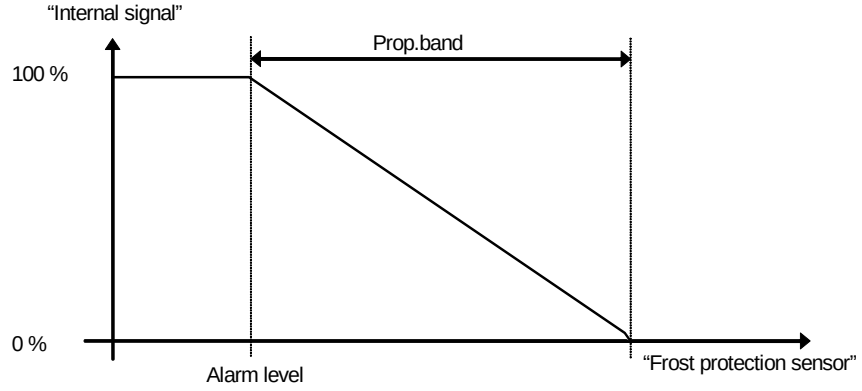
Frost protection

The heater return water temperature is measured using the analogue input ”Frost protection sensor”. Low temperatures will generate an internal, proportional signal that is used to force the heating valve open thereby preventing freeze-up of the heater.

The internal signal (“Internal signal”) is 100 % when the signal ”Frost protection sensor” is equal to or lower than “Alarm level”.

When ”Internal signal” reaches 100% or the digital input ”Frost protection” is activated, the unit is shut down, the heating output is set to completely open mode and an alarm is activated. When ”Frost protection sensor” is higher than ”Alarm level” the signal declines linearly to 0 for ”Frost protection sensor” equal to or higher than “Alarm level” + “Prop. Band”.

The frost protection alarm level is set in the menu *Settings/Alarm settings/Alarm limit.*



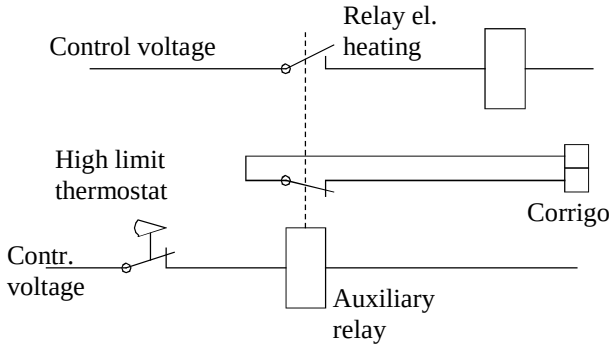
Shutdown mode

If frost protection is activated the controller will go into ”Shutdown mode” when the running mode switches to ”Off”. The shutdown controller will control the heating output to maintain a constant settable temperature at the frost protection sensor.

5.1.2.2 Electric heating

Control

The heating is controlled using the analogue output ”Y1 Heating”. On activation of the digital input “High temp limit/Frost protection” the unit will be shut down, either according to the stop sequence described in the section *Start/Stop of unit* or as an emergency shut down. The unit will restart after the alarm has been acknowledged and “High temp limit/Frost protection” has reset. Note that activation of the input signal “Flow switch” will also stop the unit.



Wiring suggestion high temp limit when using electric heating.

Contacts drawn **inactivated**.

N.B. It is important that the high temperature thermostat is hardwired to disconnect the power to the heater to ensure that the heating is shut down when the thermostat is activated even if the Corrigo should be faulty.

5.1.2.3 Water heating and electric heating

The water heating is controlled by Y1 Heating, and the electric heating is controlled by the sequence Split. Split (see the section Split of optional temp sequence) must always be set to Heating. On increasing heat demand, the water heating is first activated and then, if needed, the electric heating.

Frost protection and overheating protection are both active. If step controller heating is used, the function is tied to the output signal Split.

5.1.2.4 Fast stop on overheating

If this function is active, the fans will be immediately stopped when there is an overheating alarm, regardless of the set cool-down time.

Inputs and outputs

Water heating	Electric heating	
AI		Frost protection sensor (optional)
DI**		Frost protection thermostat (optional)
	DI	High temp. limit switch
	DI	Flow switch (optional)

**Frost protection can also be created using the digital input “Frost protection thermostat”. Activation of the input will force the running mode to Off and an alarm will be activated. The heating output is set to completely open, the remaining control outputs are set to zero.

Frost protection thermostat cannot be combined with shutdown mode.

5.1.3 Heat exchangers

The heat exchanger unit can be set to one of the following alternatives:

- Plate exchanger
- Rotating exchanger
- Liquid connected exchanger
- Mixing dampers

Plate exchanger

Control

The airflow through the exchanger is controlled by a shut-off damper and a by-pass damper. Both dampers are controlled by the same analogue output ”Y2 Heat exchanger” or by two digital outputs “Exchanger 3-pos. actuator, increase” and “Exchanger, 3-pos. actuator, decrease”, and are wired so that one opens as the other closes.

Defrosting

De-icing is activated either when the digital input signal ”De-icing” is activated or when the value on the analogue input ”De-icing Exchanger” falls below the de-icing limit (-3°C). It is deactivated when the digital input is reset or the analogue input rises above the limit value plus a settable differential.

On de-icing:

A PI-controller compares the de-icing setpoint with the signal ”De-icing Exchanger”. The lesser of the output signal from this controller and the output from the ordinary controller is used as output to the dampers.

Rotating exchanger

Control

Rotational speed is controlled by the analogue signal ”Y2 Heat exchanger” or by two digital outputs “Exchanger 3-pos. actuator, increase” and “Exchanger, 3-pos. actuator, decrease”. A rotation sentinel can be connected to the digital input ”Rotation sentinel Exchanger”. An alarm is generated if this input is activated at the same time as the analogue output signal is higher than 1.0V.

Liquid connected exchanger

Control

A mixing valve in the exchanger circulation system is controlled by the analogue signal ”Y2 Heat exchanger” or by two digital outputs “Exchanger 3-pos. actuator, increase” and “Exchanger, 3-pos. actuator, decrease”.

The circulation pump (digital output ”Start/stop circulation pump, liquid exchanger”) is started as soon as the actuator control signal exceeds 0.1 V and is stopped when the valve has been closed for more than 5 minutes.

Defrosting

De-icing is activated either when the digital input signal ”De-icing” is activated or when the value on the analogue input ”De-icing Exchanger” falls below the de-icing limit (-3°C). It is deactivated when the digital input is reset or the analogue input rises above the limit value plus a settable differential.

On de-icing:

A PI-controller compares the de-icing setpoint with the signal ”De-icing Exchanger”. The lesser of the output signal from this controller and the output from the ordinary controller is used as output to the actuator.

Outdoor temp control of exchanger

Instead of using Y2 for analogue control of the heat exchanger it can be set to run on-off against outdoor temperature. The function controls a digital output “Exch control”, which is activated when the outdoor temperature falls below a set value.

Mixing dampers

Control

The analogue output ”Y2 Heat exchanger” controls two dampers for gradual mixing of fresh air and recirculated air. In this mode the output signal decreases with increasing heat demand.

CO_2

If demand controlled ventilation (see 5.3.2) is activated in combination with mixing dampers, and the CO_2-value rises above the setpoint value, the dampers will let in more fresh air. The function is controlled by a PI-controller. Factory settings: P-band 100ppm and I-time 100 seconds. These values can only be changed in E tool.

Minimum limit

A fresh air minimum limit for can be set using the front panel. The limit value is settable between 0 and 100%.

Inputs and outputs

Plate	Rotating	Liquid	Dampers	
AI	**AI**	**AI**	**AI**	Outdoor temp sensor (optional, outd. temp start)
DO	**DO**	**DO**	**DO**	Activation exchanger (optional, outd. temp start)
AI		**AI**		De-icing sensor (optional)
DI		**DI**		De-icing signal (optional)
	DI			Rotation sentinel, exchanger (optional)

5.1.4 Step controller Heating/ DX cooling

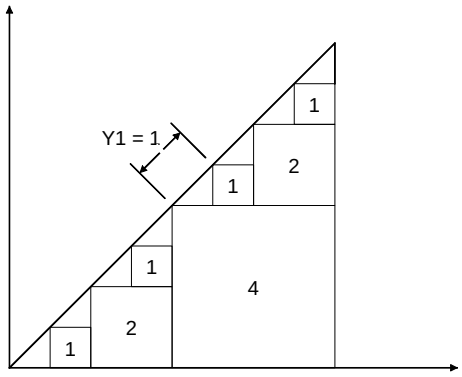
As alternative or complement to the above mentioned analogue control, heating and cooling can be activated in steps. The internal signal is then used to activate digital outputs for control of the heaters/chillers. Up to four heater outputs and three cooler outputs can be configured. There are two possible modes:

Sequential

Each output step has individually settable on- and off-values in % of the control signal. The number of steps is equal to the number of heater/chiller groups. Min on and off times can be set.

Binary

The heater power outputs should be binary weighted (1:2:4:8 for heating, 1:2:4 for cooling). The number of loads to be controlled is set. Thereafter the program will automatically calculate the individual activation levels. Switching differential and minimum on/off times can be set. The number of heating steps will be: $2^{\text{no. of groups}}$-1. In binary mode, the analogue output signal may be used to fill out between the steps. The signal will go 0…100 % between the activation of each step. The load connected to the analogue signal should have the same size as the smallest of the binary groups. In the example below there are 4 heater groups (1:1:2:4) and the total number of heating steps is 8.



Step controllers and Change-over

The digital output signals Heating/Cooling 1, Heating/Cooling 2 and Heating/Cooling 3 are used for step controllers during Change-over control (see section 5.1.12). They have the same functions as other step controller outputs, but are set to either heating or cooling depending on whether heating or cooling is required.

DX cooling with room or extract air control

If DX cooling is used in conjunction with room temperature control or extract air temperature control, there are two configuration alternatives, DX cooling or DX cooling with exchanger control.

DX cooling without exchanger control

When running cascade control, the supply air controller setpoint is normally controlled by the room/extract air controller output signal.

When DX cooling is activated, the cooling controller setpoint is lowered to 5 degrees (settable) below the setpoint given by the room/extract air controller. This prevents the DX cooling from being activated/deactivated too often.

DX cooling with exchanger control

When running cascade control, the supply air controller setpoint is normally controlled by the room/extract air controller output signal.

When DX cooling is activated, the cooling controller setpoint is lowered to 5 degrees (settable) below the setpoint given by the room/extract air controller. This prevents the DX cooling from being activated/deactivated too often.

If the supply air temperature falls below the setpoint given by the room/extract air controller, the heat exchanger output will be activated in order to try to maintain the supply air setpoint given by the room/extract air controller. The output uses P-control with a P-band of half the setpoint lowering (settable, 2.5°C as default). The setpoint given by the room/extract air controller cannot drop below the set min limit. When there is no longer a cooling demand, the cooling controller setpoint will return to the value given by the room/extract air controller.

Note: The function cannot be used if the exchanger signal controls a mixing damper.

Example: The room controller gives a supply air setpoint of 16°C. If there is a cooling demand, the cooling controller setpoint is lowered to 11°C (16 – 5) and DX cooling is activated. Should the supply air temperature sink below 16°C, the exchanger output will be activated and reach 100% output when the supply air temperature has fallen to 13.5°C (16 – 2.5).

Blocking of DX cooling at low outdoor temperature

DX cooling can be blocked when the outdoor temperature is low. It is possible to block the three cooling steps individually or to block all DX cooling. The temperature limits are settable (+13°C default) and have a fixed 1 degree hysteresis.

When two DX cooling steps are used with binary function, the cooling effect is divided into three steps. The desired blocking level can be set individually for each of these steps.

When three DX cooling steps are used with binary function, the cooling effect is divided into seven steps. However, the controller still only has three blocking level settings. Therefore, Blocking step 1 will apply to binary steps 1 and 2, Blocking step 2 to binary steps 3 and 4, and Blocking step 3 to binary steps 5, 6 and 7.

Blocking of DX cooling at low supply air fan speed

When DX cooling is used in conjunction with pressure controlled or flow controlled fans it is possible to block DX cooling if the supply air fan control signal falls below a preset values. For sequential control, the blocking level is individually settable for each DX cooling step.

When two DX cooling steps are used with binary function, the cooling effect is divided into three steps. The desired blocking level can be set individually for each of these steps.

When three DX cooling steps are used with binary function, the cooling effect is divided into seven steps. However, the controller still only has three blocking level settings. Therefore, Blocking step 1 will apply to binary steps 1 and 2, Blocking step 2 to binary steps 3 and 4, and Blocking step 3 to binary steps 5, 6 and 7.

Blocking of DX cooling on cooling pump alarm

Corrigo can be configured to block DX cooling on cooling pump alarm.

Inputs and outputs

Heating	Cooling	Heating/ Cooling Change-over	
DO	**DO**	**DO**	Step controller, step 1 (optional)
DO	**DO**	**DO**	Step controller, step 2 (optional)
DO	**DO**	**DO**	Step controller, step 3 (optional)
DO			Step controller, step 4 (optional)

5.1.5 Support control

Support control is normally used when room temperature control or extract air control has been configured. When extract air control is configured a room sensor must be installed. “Support control Heating” or “Support control Cooling” will run if Support control is configured, the running mode is in Off-state (timer control OFF and not in extended running) and if conditions call for support control (see below). Minimum run time is settable 0 to 720 minutes (FS= 20 minutes).

Support control can also be configured when using supply air temperature control, on the condition that a room sensor is installed. As usual, the controller uses the configured min. (FS=15°C) and max. (FS=30°C) limitation values as support control setpoints. However, in this case the min. and max. limitation values cannot be changed. To change the values you can temporarily configure room control, change the min. and max. values, and then change back to supply air control.

Moreover, support control can be configured to only start with the supply air fan. In this mode, the extract air fan is not active. This requires a digital output to be configured which makes the recirculation damper open completely, so that the supply air fan can circulate the air to and from the room. The digital output is called ”recirculation damper”.

Support control heating

Demand for support control heating is when the room temperature is lower than the start value which is settable 0 to 30°C. The fans will run at the preset speed, the heater and the heat exchanger are controlled by the supply air temperature controller with the configured max limitation for the supply air (FS=30°C) as setpoint and the cooling is shut off (0%). Support control heating stops when the room temperature rises to the stop value and the minimum run time has been exceeded or the running mode changes to ”On”.

Support control cooling

Demand for support control cooling is when the room temperature is higher than the start value which is settable 20 to 50°C. The fans will run at the preset speed, the heater and the heat exchanger are shut down (0 %) and the cooling is controlled by the supply air temperature controller with the configured minimum limitation (FS=15°C) as setpoint.

Support control cooling stops when the temperature falls below the stop value and the minimum run time has been exceeded or the running mode changes to ”On”.

5.1.6 Free cooling

This function is used during the summer to cool the building night-time using cool outdoor air, thereby reducing the need for cooling during the day and saving energy.

Free cooling requires an outdoor sensor and either a room sensor *or* an extract air sensor. The outdoor sensor can be placed in the fresh air inlet duct.

Free cooling is only activated when all the start conditions are fulfilled.

Start conditions:

- Less than 4 days have passed since the unit was last in running mode.
- The outdoor temperature during the previous running period exceeded a set limit (22°C).
- It is between 00:00 and 07:00:00 in the day (settable).
- The timer outputs for normal speed, Extended running normal and External stop are Off.
- A timer channel will be On sometime during the recently started 24 hours.

If the outdoor sensor is located in the fresh air inlet duct and/or an extract air sensor is selected and ALL the start conditions are fulfilled, free cooling is activated and will run for 3 minutes to ensure that the temperature measurement when using an extract air sensor reflects the corresponding room temperature and that the outdoor temperature sensor senses the outdoor temperature even if it is placed in the fresh air inlet duct. If the outdoor sensor is not located in the fresh air inlet duct and a room sensor has been selected, the unit will not start free cooling as long as all the temperatures are not within the start and stop temperature intervals.

After 3 minutes, the stop conditions will be controlled.

Stop conditions:

- Outdoor temp above the set max value (18°C) or below the set min value (condensation risk, 10°C).
- The room temp/extract air temp is below the set stop value (18°C).
- One of the timer outputs for normal speed, External stop or Extended running normal is On.
- It is past 07:00:00 in the day.

If any stop condition is fulfilled after 3 minutes, the unit will stop again. Otherwise, operation will continue until a stop condition is fulfilled.

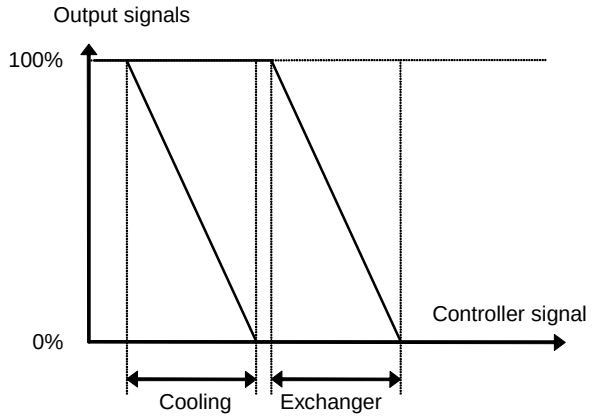
When free cooling is active, the fans run at normal speed or the set value for pressure/flow control and the digital output Free cooling is active. The outputs Y1-Heating, Y2-Heat exchanger and Y3-Cooling are shut down. After free cooling has been activated, the heating output is blocked for 60 minutes (configurable time).

Inputs and outputs

AI	Outdoor temperature sensor
AI	Room sensor *or* Exhaust air sensor
DO	Free cooling

5.1.7 Cooling recovery

If the extract air temperature is a settable amount lower than the outdoor temperature, cooling recovery can be activated. When cooling recovery is activated the heat exchanger signal will be reversed to give increasing recovery on increasing cooling demand.



Inputs and outputs

AI	Outdoor temperature sensor
AI	Exhaust air sensor

5.1.8 Enthalpy control

Calculating the enthalpy means calculating the energy content of the air, taking into consideration both the temperature and air humidity. The value is given in energy per kilogram air (kJ/kg). If enthalpy control is configured, the enthalpy will be calculated both indoors and outdoors. If the enthalpy is higher outdoors than indoors, the recirculation damper will be overridden to increase the recirculation. The function is not active when using free cooling. In this case, outdoor air is used to cool the room instead. For the enthalpy to be calculated, four sensors are required:

Inputs and outputs

AI	Outdoor temperature sensor
AI	Outdoor humidity sensor
AI	Room/Extract air temperature sensor
AI	Room humidity sensor

5.1.9 Heat exchanger efficiency monitoring

General

The function calculates the heat exchangers temperature efficiency in % when the output signal to the exchanger is higher than 5% and the outdoor temperature is lower than 10°C.

When the control signal is lower than 5% or the outdoor temperature is higher than 10°C the display will show 0%.

The heat exchanger efficiency is calculated using the following formula:

$$Efficiency = \frac{Extractairtemp - Exhaustairtemp}{Extractairtemp - Outdoortemp} * 100$$

Alarms

An alarm is activated if the efficiency falls below the set alarm level (50%).

Inputs and outputs

AI	Outdoor temperature sensor
AI	Exhaust air sensor
AI	Extract air temperature sensor

5.1.10 External setpoint

An external setpoint device, for example TBI-PT1000 or TG-R4/PT1000 can be connected. The setpoint device must follow the PT1000 resistance curve. The unit is connected to the analogue input signal ”Extra sensor”. The function must be activated in the menu ”Configuration/External setpoint”. The setting range can be min/max limited via a setting in the controller. The factory setting is min: +12, max: +30.

Inputs and outputs

AI	Extra sensor

5.1.11 Recirculation

Recirculation is a function for distributing the air in the room using the supply air fan. The function can be used even when there is no heating or cooling demand. When using recirculation control, the extract air fan stops and a recirculation damper opens which allows the air to circulate through the unit.

Recirculation is activated either via a digital input signal or by connecting it to Timer output 5. If timer output for normal/reduced speed is activated during recirculation via Timer output 5, normal/reduced speed gets priority. If timer output for normal/reduced speed is activated during recirculation via a digital input, recirculation gets priority.

Recirculation control can be configured as either air circulation (temperature control inactive) or air circulation with temperature control. (Only heating, only cooling or both heating and cooling). Recirculation control has its own setpoint. However, the other settings are the same as for normal operation, i. e. if normal operation has been configured as room control, room control will also be used during recirculation.

To lower the temperature, it is possible to configure free cooling to be used during recirculation, if the conditions for free cooling are fulfilled. Then, the recirculation damper closes, the supply and extract air dampers open and the extract air fan starts (the supply air fan also starts, if it is not already running). If the free cooling function is not configured for recirculation control and you want to cool down the supply air via a low recirculation setpoint, the cooling battery will be used. A max. room temperature can be configured for recirculation control. If the room temperature rises above the set value (FS 25°C), recirculation will be stopped. When the room temperature has fallen 1 K below the set max limit, recirculation will start again if the start conditions are still fulfilled.

When running frequency controlled fans and using recirculation control you can, depending on the type of fan control, configure a special pressure/flow offset for the setpoint or a manual output signal for the supply air fan.

5.1.12 Change-over

Change-over is a function for installations with 2-pipe systems. It makes it possible to use the same pipe for both heating and cooling, depending on whether heating or cooling is required.

A special analogue output signal, Y1 Heating/Y3 Cooling, is used for Change-over control. Switching between heating and cooling can be done in two ways. A digital Change-over input signal is normally used. Open contact will give heating control and closed contact cooling control. If the input has not been configured, change-over is handled by the internal controller signal. The output signal will follow the two regular output signals Y1 Heating and Y3 Cooling. When heating, the digital outputs *Heating activate* and *Step controller heating step 1-4* are active. When cooling, *Cooling activate* and *Step controller cooling step 1-3* are active.

If frost protection sensor has been configured, it will function in the usual way when heating is active. However, when cooling is active, it will only be used for indicating temperature.

Three digital output signals, Heating/Cooling step 1, Heating/Cooling step 2 and Heating/Cooling step 3, are also connected with change-over. The signals can be used for reversing a step controlled heating pump etc. See also section 5.1.4 Step controller Heating/ DX cooling.

5.2 Extra control circuit

An independent temperature control circuit for control of for example after-heaters. The circuit can be configured to heating or cooling. It has an analogue input signal for temperature sensors and an analogue output signal 0…10V. There is also a digital output signal which is activated when the analogue output signal is above 1 V and deactivated when the analogue signal is below 0.1 V. The circuit can be configured to be active all the time or to be active only when the main unit is running at normal speed.

5.3 Humidity control

General

Humidity control can be configured as Humidification, Dehumidification or both Humidification and Dehumidification.

Two humidity sensors can be connected, a room sensor for control and an optional duct sensor for maximum limiting. The limit sensor can be omitted.

The humidity control is handled by a PI-controller.

The humidity sensors must give 0…10V for 0…100% RH.

Humidification

An analogue output is used to control a humidifier. The output will increase on decreasing humidity. A digital output can also be used to start a humidifier.

Dehumidification

An analogue output is used to control a dehumidifier. The output will increase on increasing humidity. A digital output can also be used to start a dehumidifier.

Humidification/dehumidification

An analogue output is used to control a humidifier. The output will increase on decreasing humidity.

The cooling output Y3 will be activated for dehumidification through condensation. The output will increase on increasing humidity. This signal overrides the cooling signal from the temperature controller so the output can be activated for dehumidification even if the temperature controller demand is zero.

For good temperature control when using cooling for dehumidification it is important that the cooler is placed first in the air stream so that the exchanger and heater can be used to reheat the air after dehumidification.

Digital humidity signal

A digital output signal, Dehumidification/Humidification, can be used for on/off control of humidifier/dehumidifier. The output signal has an activation value and a deactivation value which are connected to the humidity controller output. The signal is activated when the humidity controller output rises above the set activation value and is deactivated when the humidity controller output drops below the set deactivation value.

Inputs and outputs

AI	Room humidity sensor
AI	Duct humidity sensor
AO	Humidity control output 0…10 V DC
DO	Dehumidification/Humidification

5.4 Fan control

General

Fans can be single speed, 2 speed or variable speed via a frequency converter.

Single speed fans are controlled using the digital outputs Start SAF-Normal and Start EAF-Normal.

2-speed fans are controlled using the digital outputs Start SAF-Normal and Start EAF-Normal as well as Start SAF-reduced and Start EAF-reduced giving normal and reduced speed respectively.

Variable speed control uses an analogue output per fan for controlling a frequency converter. There are two setpoints for each fan, Normal and Reduced. Pressure or air flow control can be used.

Variable speed fans can also be configured to be run with fixed output values.

Outdoor compensation

When running pressure control, it is also possible to outdoor compensate the pressure.

Crosswise interlock

Via the display it is possible to configure crosswise interlocking between the supply air and extract air fans.

Timer control, interlock at low outdoor temperature

The fans are normally controlled by the timer channels for normal and reduced speed. At very low outdoor temperature 2-speed and pressure/flow controlled fans can be forced to low speed. The limit temperature is settable and the function has a differential of 2K.

Normal, reduced speed

Units with 2-speed or pressure control fans are always started at reduced speed. After a settable time, Corrigo switches to Normal speed if normal speed is valid at start-up. When 2-speed fans are switched from Reduced to Normal speed, Reduced speed is first disengaged. About 2 sec later, Normal speed is activated.

When Corrigo switches from Normal to Reduced speed, there is a settable retardation time from the disengagement of Normal speed to the activation of Reduced speed. See the section Retardation time.

The extract air fan and the supply air fan have individual start and stop delays which are normally set so that the extract air fan is started before the supply air fan. If there are not enough digital outputs for individual control, both fans will have to be started using the signal for the supply air fan, and the delay be created using an external time relay.

5.4.1 Pressure control

Frequency control pressure

When running pressure control, two analogue output signals are used for supply and extract air respectively. The signals control the fan speeds via frequency converters, thereby maintaining constant pressure. A digital activation signal is normally used for each fan (Start SAF frequency converter and Start EAF frequency converter), for sending a start signal to the frequency converters. The start signal is activated as long as the fan is expected to be running.

For the supply and extract air fans, there are two individually settable setpoint values, one corresponding to normal speed and one corresponding to reduced speed. Changing between the two setpoint values is done using the timer channels for normal and reduced speed or using digital input signals (extended running normal and extended running reduced).

Outdoor compensation

When running pressure control, it is also possible to outdoor compensate the pressure setpoint value.

The outdoor compensation is linear and is set using two parameter pairs which give the value of the compensation at two different outdoor temperatures. The compensation can be positive or negative.

The outdoor compensation is set in the menu Actual/Setpoint.

Using E tool, you can also choose to only outdoor compensate the pressure value of the supply air fan. In that case, the extract air fan is controlled with constant flow, independent of the outdoor temperature.

Frequency control flow

Instead of giving a pressure setpoint value, it is possible to use an airflow volume value in m^3/h. The value from the pressure transmitter is recalculated to a volume flow using the formula below and the fans will be controlled to give a constant flow.

$$Flow = K * \Delta P^{X}$$

Where K and ^{X} are settable constants dependent on the fan size and Δ P is the differential pressure, measured in Pa, over the fan. Each fan has its own set of parameters.

^{X} is normally 0.5 indicating that the flow is proportional to the square root of the differential pressure.

Outdoor compensation

Also when running flow control, it is possible to outdoor compensate the setpoint value.

The outdoor compensation is linear and is set using two parameter pairs which give the value of the compensation at two different outdoor temperatures. The compensation can be positive or negative.

The outdoor compensation is set in the menu Actual/Setpoint.

Using E tool, you can also choose to only outdoor compensate the flow of the supply air fan. In that case, the extract air fan is controlled using constant flow, independent of the outdoor temperature.

Frequency control manual

Frequency controlled fans can be controlled at a fixed rotational speed. The rotational speed is selected by setting a fixed output signal (0 – 100%). Values for normal and reduced speed can be configured for each fan.

Fans that are run with a fixed output signal can also be outdoor compensated (see the section above). In this mode, pressure sensors are not needed.

Frequency control external control signal

Two 0…10 V input signals are used for direct control of frequency controlled fans. The signal is received from for example a VAV unit. The signal controls the fans 0…100% (0…10V on the analogue output). Pressure transmitters are not used in this control mode.

Frequency control SAF with EAF slave

The rotational speed of the supply air fan is controlled by a pressure transmitter which is placed in the supply air duct. The extract air fan does not have a pressure transmitter, instead you let the output for the extract air fan follow the control signal for the supply air fan. A scaling factor can be added if the characteristics of the extract air fan are not the same as the characteristics of the supply air fan. (Only pressure control of the supply air fan is possible using this function).

Frequency control SAF with flow control EAF

The rotational speed of the supply air fan is controlled by a pressure transmitter which is placed in the supply air duct. The extract air fan is controlled by the supply air flow, in order to achieve a balanced ventilation. A pressure transmitter which is placed in the supply air fan cone (Pressure transmitter SAF 2) gives a measured value of the current supply air flow. A corresponding pressure transmitter is placed in the extract air fan cone and gives a measured value of the extract air flow.

The extract air fan is controlled using the supply air flow as setpoint. A scaling factor can be added if the characteristics of the extract air fan are not the same as the characteristics of the supply air fan.

Minimum limit

For frequency controlled fans an adjustable minimum limit can be set individually on the supply air and extract air fan control signals.

Inputs and outputs

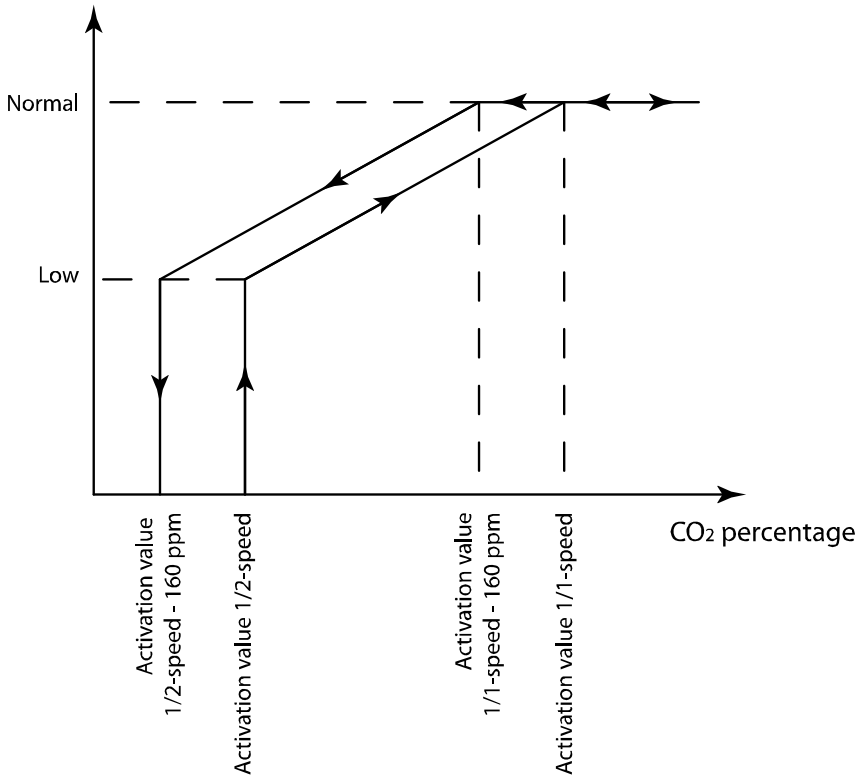
1 -speed	2 -speed	Pres-sure/ Flow	
DO	**DO**		Start SAF Normal
DO	**DO**		Start EAF Normal
	DO		Start SAF reduced
	DO		Start EAF reduced
		DO	SAF frequency start
		DO	EAF frequency start
DI	**DI**		Indication/alarm SAF
DI	**DI**		Indication/alarm EAF
		AI	Pressure transmitter SAF
		AI	Pressure transmitter EAF
		AI	Pressure transmitter 2 SAF
		AO	Frequency converter SAF
		AO	Frequency converter EAF

5.4.2 Demand controlled ventilation

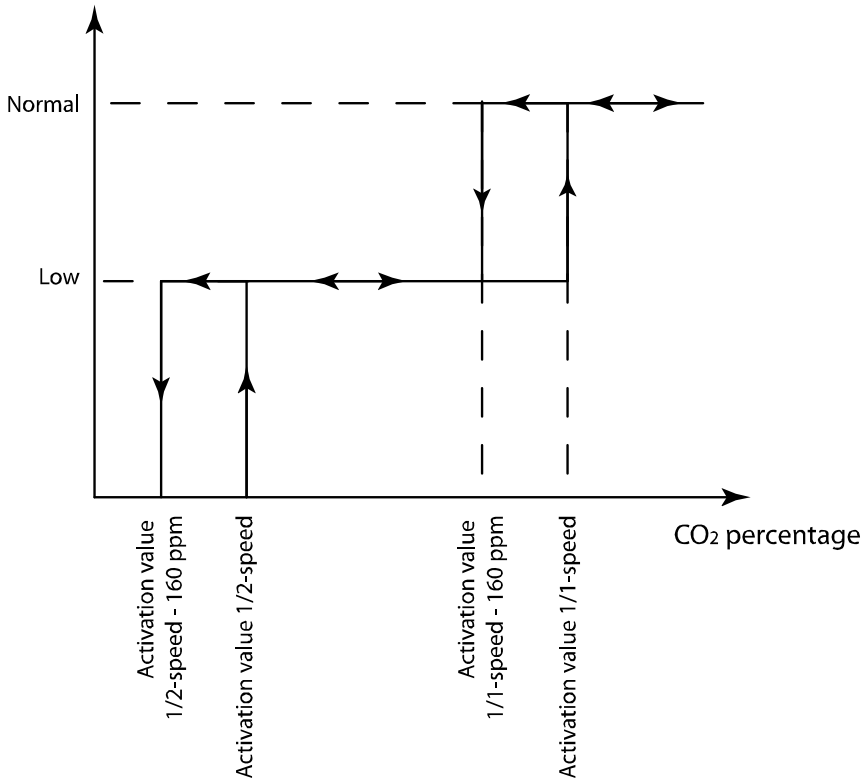
In applications with varying occupancy the fan speeds or mixing dampers can be controlled by the air quality as measured by a CO_2/VOC-sensor.

You can choose to activate the function 1. Always, 2. Only when the running mode is On, 3. Only when the running mode is Off.

When the function is activated and combined with pressure controlled fans and the CO_2/VOC-value rises above control value 1 the fans will start at low speed, if they are not already running. Should the CO_2/VOC-value continue to rise the fan speed will also increase until the CO_2/VOC-value reaches control value 2 at which point the fans will be running at normal speed. The fans will stop when the CO_2/VOC-value falls 160 ppm below control value 1.



When used with two-speed fans they will start using low speed when the CO_2/VOC-value rises above control value 1 and switch to normal speed when the CO_2/VOC-value reaches control value 2. The fans will stop when the CO_2/VOC-value falls 160 ppm below control value 1.



If demand controlled ventilation is activated in combination with mixing dampers, and the CO_2-value rises above the setpoint value, the dampers will let in more fresh air. The function is controlled by a PI-controller. See section 5.1.3 Heat exchanger types.

The function has a settable minimum running time.

Inputs and outputs

AI	CO_2 sensors

5.5 Pump control

Digital inputs and outputs can be configured for pump control.

All the pumps can use run indication with malfunction alarm *or* an alarm input connected to a motor protection or similar.

5.5.1 Heating circuit

The circulation pump for the heating circuit will always run when the outdoor temperature is lower than a settable value (+10°C). At higher outdoor temperatures the pump will run when the heating output is larger than 0V.

If no outdoor temperature sensor has been configured, the stop temperature can be set to 0°C. Then the pump will only run on heat demand.

The pump has a settable, shortest running time.

The pump will be exercised once daily at 3 p.m. for 1 minute or the set shortest running time, whichever is the longest.

5.5.2 Exchanger circuit, liquid connected exchangers

The circulation pump for the exchanger circuit will run when the output to the exchanger valve is larger than 0V.

The pump has a settable, shortest running time.

The pump will be exercised once daily at 3 p.m. for 1 minute or the set shortest running time, whichever is the longest.

5.5.3 Cooling circuit

The circulation pump for the cooling circuit will run when the output to the cooling valve is larger than 0V.

The pump has a settable, shortest running time.

The pump will be exercised once daily at 3 p.m. for 1 minute or the set shortest running time, whichever is the longest.

Corrigo E can be configured to block DX cooling if a ”Malfunction P1-Cooling” alarm should occur.

Inputs and outputs

Heating	Exch	Cooling	
AI			Outdoor temperature sensor
DO	**DO**	**DO**	Start/stop circulation pump
DI	**DI**	**DI**	Run ind/alarm, circ. pump

5.6 Damper control

5.6.1 Close-off dampers

The fresh air and exhaust air ducts close-off dampers can be controlled by digital outputs or be hard-wired to the supply air fan relays for normal and reduced speed in such a fashion that the damper is open when the supply air fan is running. When using pressure controlled fans the digital activation signal is activated as soon as the fan has start conditions. This signal can be used to open the close-off damper.

5.6.2 Fire dampers

Fire dampers are normally configured to open on fire alarm. However, via the display you can configure them to be normally open instead.

In Corrigo controllers of generation 1, it was possible to choose whether the extract air fan should be activated on fire alarm or if both fans should be stopped.

For generation 2 controllers, you can use E tool to configure the air handling unit's running mode on fire alarm. The following choices are possible: Stopped, continuous run, run via normal start/stop conditions, only supply air fan in operation, only extract air fan in operation.

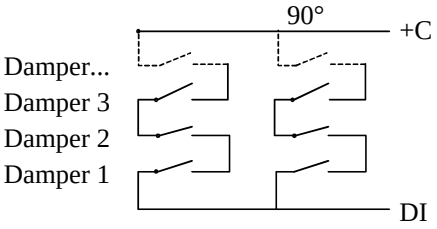
For compatibility reasons, the old function has not been removed in generation 2 controllers. This means that old configuration files can be used in new Corrigo controllers as well. If the running mode in the new application has been set to another value than Stopped, this value will take precedence over the value in the old application.

There is a digital input for detection of open and closed position of the fire dampers.

Fire damper exercising

Fire damper exercising can be configured. The exercise interval is settable. To be able to use this function, all the dampers must have end-position switches.

The digital input: *Fire damper end-switch monitoring* should be wired to all the fire damper end position switches.



When the test cycle is initiated, the output *Fire dampers* will be activated and the dampers will begin to move. Within the set time (90 sec) the signal on the input *Fire damper end-switch monitoring* must change to indicate that the dampers have left their normal positions. If not an alarm will be triggered.

Then, within the set time, the signal on the input *Fire damper end-switch monitoring* must change again to indicate that all the dampers have reached the other end position. If not an alarm will be triggered.

When all dampers have reached the end position the output *Fire dampers* will be reset to drive the dampers back to normal position. Again, within the set time (90 sec) the signal on the input *Fire damper end-switch monitoring* must change to indicate that the dampers have left the end positions. If not an alarm will be triggered.

Then, within the set time, the signal on the input *Fire damper end-switch monitoring* must change again to indicate that all the dampers are back to their normal positions. If not an alarm will be triggered.

The controller can be configured to stop the air handling unit during the damper testing.

All dampers must be wired to the same output in order to get correct results.

The fire alarm input can be configured as normally closed or normally open.

Inputs and outputs

DO	Fresh air damper control
DO	Exhaust air damper control
DO	Fire dampers
DI	Fire alarm
DI	Fire damper end switch monitoring

5.7 Extended running and External stop

The digital inputs for extended running can be used to force the unit to start although the timer says the running mode should be “Off”. Normal running always takes precedence over reduced speed. External activ. Normal takes precedence over the timer output for reduced speed.

For 2-speed fans and pressure/flow controlled fans there are inputs for normal speed and reduced speed. The unit will run for the set time. If the running time is set to 0 the unit will only run as long as the digital input is closed.

The signal ”External switch” will stop the unit, even if the timer or one of the signals External activ. Normal or External activ. Reduced says it should stay in running mode.

Inputs and outputs

DI	External activ. normal
DI	External activ. reduced
DI	External switch

5.8 Time-switch outputs

Up to 5 digital time-switch outputs can be configured. Each timer channel has a separate scheduler with two periods per week-day.

Timer output 5 can be used for controlling the function Recirculation. See 5.1.11.

Inputs and outputs

DO	Extra Timer channel 1
DO	Extra Timer channel 2
DO	Extra Timer channel 3
DO	Extra Timer channel 4
DO	Extra Timer channel 5

5.9 Alarms

Alarm handling

Alarms are indicated by the red alarm LED on the front or on E-DSP.

All alarms can be monitored, acknowledged and blocked using the display and buttons.

Alarm priorities

Alarms can be given different priority levels, A-alarm, B-alarm, C-alarm or not active. Digital outputs can be bound to act as alarm outputs for A-alarms or B-alarms or both A- and B alarms. C-alarms are internal alarms which are not forwarded. A- and B-alarms must be acknowledged to reset. C-alarms automatically reset as soon as there is no longer a cause for alarm.

Stop function

For each alarm there is the possibility of choosing whether activated alarm should stop control or not. Automatic restart will take place after removal of the alarm cause and the alarm has been acknowledged.

For some alarm types such as electric heating high temperature limit and water heating frost protection it would be dangerous to not stop the unit on alarm. Therefore, for such alarm types, the program will always reset the stop function to Active even if the operator should choose Inactive.

Unfortunately it is not possible to remove the display text concerning the stop function for these alarm types. This since the available program space demands that all alarms are treated in the same way in the display.

Note: For alarms that have been set to Inactive, the extra stop function should also be set to Inactive, or unexpected malfunctions may occur.

Alarm text

The alarm text that should be shown in the display when there is an alarm can be changed using E tool. For more information, see the E tool manual.

Inputs and outputs

DO	Sum alarm A + B
DO	Sum alarm A
DO	Sum alarm B

Chapter 6 **Starting and stopping the unit**

6.1 Start conditions

The unit will be started and will run when any one of the following conditions is met:

1. Timer output for normal speed or timer output for reduced speed is ON (normal running)
2. The unit is started manually using the Corrigo E front panel
3. Digital input for extended running is activated (normal running)
4. Support control is activated and the current room temperature is higher/lower than the preset starting value (Support heating/cooling)
5. Demand controlled ventilation is activated and the value at the CO2 sensor is higher than the preset start condition
6. Recirculation control has been configured and the conditions for recirculation control are fulfilled

6.2 Stop conditions

The unit will be stopped when any of the following conditions are met:

1. Timer output for normal speed or timer output for reduced speed are OFF, and the signal for extended running is OFF.
2. Activated frost protection alarm. The unit will restart on resetting of the alarm.
3. Activated fire detector if the function has been configured. The unit will restart on resetting of the alarm.
4. If the unit has electric heating and the supply fan flow switch alarm or the high temperature limit alarm is activated.
5. Activation of external stop switch.
6. The unit is stopped manually using the Corrigo E front panel.
7. Support control is activated and the current room temperature is higher/lower than the pre-set stop value (support heating/cooling)
8. Demand controlled ventilation is activated and the value at the CO2 sensor falls below the pre-set start condition less the set differential.
9. Recirculation control is active and the conditions for recirculation control are no longer fulfilled.
10. At an activated alarm configured with the extra function of stopping the unit on activation. The unit will restart on resetting of the alarm.

6.3 Start sequence

Start of the unit will run according to the following sequence:

1. If the controller is configured for water heating and has an outdoor temperature sensor and the outdoor temperature is below +3ºC the heating valve is opened and the heating circulation pump is started.
2. If the controller is configured with a heat exchanger and has an outdoor temperature sensor and the outdoor temperature is below +15ºC the heat exchanger will be run at 100% capacity for a pre-set time.
3. Signals for fresh air and exhaust air dampers are activated

4. The supply air fan or the control of the supply air pressure will be started after a preset time.
5. The extract air fan or the control of the extract air pressure will be started after a preset time.
6. Thereafter temperature control according to the configured control mode is started. Electric heating, if configured, is not started until a run signal from the supply air fan or flow switch has been received. And not yet activated pumps will be started.
7. After a pre-set delay, the alarm handling system is activated. The unit is in normal running mode.

6.4 Stop sequence

Stopping of the unit will run according to the following sequence:

1. Deactivation of the alarm handling system.
2. Electric heating, if configured, is shut down.
3. After individually set delay times the fans are stopped.
4. Fresh air and exhaust air dampers are shut down
5. Actuator signals are set to 0 and the pumps are stopped.
6. If shutdown mode is configured, it will be activated

Chapter 7 Display, LEDs and buttons

This section is applicable to Corrigo E units with display and buttons but also to the hand terminal E-DSP which can be connected to Corrigo E units without display and buttons.

7.1 Display

The display has 4 rows of 20 characters.

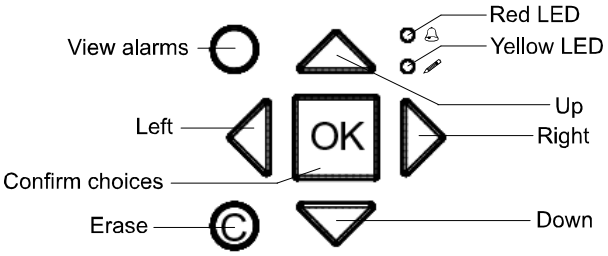
It has background illumination. The illumination is normally off, but is activated as soon as a button is pressed. The illumination will be turned off again after a period of inactivity.

7.2 LEDs

There are two LEDs on the front: The alarm LED marked with the 🔔 symbol. The “write enable” LED marked with the ✎ symbol.

The four LEDs placed next to the upper terminal strip will be described later.

7.3 Buttons



There are seven buttons: 4 arrow buttons which will be called UP, DOWN, RIGHT and LEFT. The menus in the Corrigo E are organized in a horizontal tree structure. The UP / DOWN-buttons are used to move between menus at the present menu level. The RIGHT / LEFT buttons are used to move between menu levels. When changing parameters the UP / DOWN buttons are used to increase / decrease the value of the parameter and the RIGHT / LEFT buttons to move between digits within the parameter.

- The OK button is used to confirm the choice of a parameter setting. See more in the section "Change parameters" below.
- The C button is used to abort an initiated parameter change and restore the original value.
- The ALARM button, marked with a red button top, is used to access the alarm list.

7.4 Navigating the menus

From revision 2.3, significant changes have been made to the Corrigo menu system. The purpose is to make the menu system more structured and user-friendly. The choice of access level/user access determines which menus are shown.

The start display, the display normally shown, is at the root of the menu tree.

```
Regulator vent. sys
2008-11-20 13:30
System: Running
Sp: 18.0 Act: 18.2°C
```

Pressing DOWN ⬇ will move you through the menu choices at this, the lowest level. UP ⬆ will move you back through the choices. Which menus are shown depends on which access level you are using (see chapter 8 for more information about logging on to higher levels).
Using normal access, the access which normally does not require logging on, only a few basic menus are shown:

```
Running mode
Temperature
Air control
Humidity control
Time settings
Access rights
```

In the menu Running mode, you can view and set the unit's running mode, view selected control functions and view the alarm events.

In the menus Temperature, Air control and Humidity control, you can view actual values and setpoint values. Setpoints can only be changed if you have Operator or System access.

In Time settings, the time, date and set running times are shown. Values can only be changed if you have Operator or System access.

Without logging on to Operator or System level, you are only authorised to change the unit's running mode and acknowledge alarms.

If you have Operator authority, you can access more information and change other operation parameters like setpoints and time functions.

If you have System authority, you have full access to the complete menu system and can change all parameters.

To enter a higher menu level, use UP or DOWN to place the display marker opposite the menu you wish to access and press RIGHT ➡ . If you have sufficient log on privileges the display will change to the menu you have chosen. At each level there may be several new menus through which you may move using the UP / DOWN buttons.

Sometimes there are further submenus linked to a menu or menu item. This is indicated by an arrow symbol at the right-hand edge of the display. To choose one, use RIGHT again. To back down to a lower menu level, use LEFT.

Change parameters

In some menus there are parameters that can be set. This is indicated by the yellow LED ✎ flashing.

A quick blinking (2 times/sec) indicates that the parameter can be changed using the present user access.
A slower blinking (1 times/sec) indicates that a higher user access is required to change the parameter.

To change a parameter, first press the OK button. If you need higher authority than you have to change the parameter, a log on menu will be displayed, see chapter 8 below. Otherwise, a cursor will appear at the first settable value. If you wish to change the value, do so by pressing the UP / DOWN buttons.

In numbers containing several digits you can move between the digits using the LEFT / RIGHT-buttons.

When the desired value is displayed press OK.

If there are further settable values displayed the cursor will automatically move to the next one.

To pass a value without changing it, press RIGHT.

To abort a change and return to the initial setting, press and hold the C-button until the cursor disappears.

Chapter 8 **Access rights**

There are four different access levels, System level which has the highest access, Service level, Operator level and the basic “no-log on” level. The choice of access level determines which menus are shown, as well as which parameters can be changed in the displayed menus.

System level gives full read / write access to all settings and parameters in all menus.

Service level gives access to all menus except the submenus Configuration/In- and Outputs and Configuration/System.

Operator level gives access to all menus except Configuration.

The basic level only permits changes in Running mode and gives read-only access to a limited number of menus.

Repeatedly press down-arrow when the start-up display is shown until the arrow-marker to the left of the text-list points to Access rights. Press right-arrow.

```
Log on
Log off
Change password
```

8.1 Log on

```
Log on
Enter password:****
Present level:None
```

In this menu it is possible to log on to any access level by entering the appropriate 4-digit code.

The log on menu will also be displayed should you try to gain access to a menu or try to do an operation requiring higher authority than you have.

Press the OK-button and a cursor marker will appear at the first digit position. Repeatedly press the up-arrow until the correct digit is displayed. Press the right-arrow to move to the next position. Repeat the procedure until all four digits are displayed. Then press OK to confirm. After a short while the text on the line: Present level will change to display the new log on level. Press left-arrow to leave the menu.

8.2 Log off

Use this menu to log off from the present level to the basic "no-log on" level.

```
Log off?
No
Present level:System
```

Automatic logoff

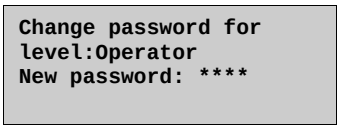
If the access level is Operator, Service or System, the user will automatically be logged off to Normal after a settable time of inactivity. See also the section Automatic logoff. It is possible to remove the automatic logoff, see 8.4 below.

8.3 Change password

As default Corrigo comes with the following passwords for the different levels:

System	1111
Service	2222
Operator	3333
Basic	5555

You can only change the password for log on levels lower or equal to the presently active level, i. e. if you are logged in as System you can change all passwords, but as Operator you can only change the Operator and Basic passwords. There is no point in changing the Basic password since access to that level is granted automatically to all users.



Note: Do not set the password for System to the same value as the password for a lower level since this will prevent access to the System level.

Forgotten your password? If the password for System has been changed and then lost, a temporary password can be obtained from Regin. This code is date dependent and only valid for one day.

8.4 Change password to remove automatic logoff

If you want to remove the automatic logoff, change the password of the desired level to 0000. After changing the password, the level will always be activated.

Note: This should be done with consideration, since no alarm is continuously given that a certain level has been activated. However, it is very useful in certain cases, if the unit is intended to be used by educated personnel or for instance at commissioning.

Chapter 9 **Running mode**

Collected here are a number of menus showing running mode, selected functions, alarm events and status of inputs and outputs.

```
Running mode
Selected functions
Alarm events
Input/Output
```

9.1 Running mode

The unit's running mode can be changed without logging on.

```
Running mode
Auto
```

```
Running time
SAF:   14.6   h
Running time
EAF:   14.6   h
```

9.2 Selected functions

Shows the current configuration. These are read-only menus. No changes can be made here.

```
Control function
Supply air control
Fan control
1-speed.
```

```
Heating:    Water
Exchanger:  Plate exc
Cooling:    Water
```

```
Free cool active: No
```

```
Support control
Active:  Yes
CO2/VOC active
If time channel on
```

```
Fire damper function
Not active
Operation when alarm
Stopped
```

```
Frost protection
Active
Cooling recovery
No
```

```
External setpoint
Not active
```

9.3 Alarm events

Alarm log which contains the 40 latest alarm events. The most recent event is listed first. The alarm log can only be used for viewing the alarm history. Alarms are handled in a special area, see section 18.1.

```
24 Nov 14:32   B
Malf. SAF

Acknowledged
```

9.4 Inputs/Outputs

This is a read-only menu block showing the current values for all configured inputs and outputs. If correction factors have been applied to input values, the corrected values will be shown.

This is a read-only menu. No changes can be made here.

```
Analogue inputs
Digital inputs
Universal inputs
Analogue outputs
Digital outputs
```

Analogue inputs and digital outputs are shown here as examples.

Analogue inputs

```
AI1: 18.5 Outdoortemp
AI2: 20.3 Supplytemp
AI3: 28.2 Extracttemp
AI4: 19.9 Roomtemp1
```

Digital outputs

```
DO1:Off SAF 1/1-speed
DO2:Off EAF 1/1-speed
DO3: On P1-Heating
DO4:Off Sum alarm
```

Chapter 10 **Temperature**

Here you can view all actual and setpoint values for temperature control. The menu is visible to all users, regardless of log on level. However, to make changes you need at least Operator authority.

The following menus are available providing that the corresponding input is activated:

Setpoint. Control mode 1: Supply air control.

```
Outdoortemp.:18.4°C
Supply air temp
Act.: 19.8°C Setp→
Setp.: 20.0°C
```

Submenu: Setpoint

```
Supply air temp
Setp.: 20.0°C
```

Setpoint. Control mode 2, 5 and 6: Outdoor compensated supply air control.

```
Outdoortemp.:18.4°C
Supply air temp
Act.:  19.8°C Setp→
Setp.: 20.0°C
```

Submenu: Setpoint

In control modes 5 and 6, the setpoint relationship is used when supply air control is active.

Use the eight breakpoints to generate a setpoint / outdoor temperature relationship.

```
Outdoor comp. setp.
-20.0°C = 25.0°C
-15.0°C = 24.0°C
-10.0°C = 23.0°C
```

```
Outdoor comp. setp.
 -5.0°C = 23.0°C
  0.0°C = 22.0°C
  5.0°C = 20.0°C
```

```
Outdoor comp. setp.
 10.0°C = 18.0°C
 15.0°C = 18.0°C
```

In-between-values are calculated using straight lines between breakpoints. Setpoints for temperatures lower than the lowest breakpoint and higher than the highest breakpoint are calculated by extending the line between the two last breakpoints at either end.

Example: At the lower end the setpoint is increasing by 1°C for every 5 °C lowering of the outdoor temperature. So the setpoint at –23°C would be 25°C + .6x 1.0°C = 25.6°C.

Setpoint. Control mode 3 and 5: Cascaded room temperature control.

```
Room temp.1
Actual: 22.0°C
Setp.:  21.5°C    ->
```

In control mode 5, the setpoint is used when cascaded room control is active.

Submenu for setting the min and max limitation temperatures for the supply air.

```
If cascade control
max/min supply setp.
Max: 30.0°C
Min: 12.0°C
```

If two room sensors have been configured you will also get the following menu:

```
Room temp.2
Actual: 21.8°C
```

Setpoint. Control mode 4 and 6: Cascaded extract air temperature control.

```
Extract air temp.
Actual: 21.0°C
Setp.:  21.1°C
```

In control mode 6, the setpoint is used when cascaded room control is active.

Submenu for setting the min and max limitation temperatures for the supply air.

```
If cascade control
max/min supply setp.
Max: 30.0°C
Min: 12.0°C
```

Support control heating

```
Support heating
Room temp for
Start: 15.0°C
Stop:  21.0°C
```

Support control cooling

```
Support cooling
Room temp for
Start: 30.0°C
Stop:  28.0°C
```

Frost protection temperature

```
Frost protection
       Actual: 30.9°C
```

De-icing exchanger

```
De-icing exchanger
    Actual: 11.2°C
     Setpoint: -3.0°C
  Hysteresis:   1.0°C
```

Heat exchanger efficiency monitoring

```
Efficiency exch.
Actual: 93%
Output exchanger
Actual: 100%
```

Recirculation See 5.1.11

```
Temp.setpoint when
recirc. (Supply/
Extract/Room)
18.0°C
```

```
Offset SAF when
frequency control
and recirculation:
 0.0 Pa
```

Offset SAF makes it possible to add an offset to the setpoint during normal operation. If pressure control has been configured, the offset is set in Pa. If flow control has been configured, it is set in m3/h. If manual control has been configured, the offset is set in %.

Extra control circuit See 5.2

```
Extra control circuit
Actual:   21.2°C
Setpoint: 20.0°C
```

Enthalpy control

```
Enthalpy indoor:
  33.8 KJ/Kg
Enthalpy outdoor:
  35.0 KJ/Kg
```

Submenus

```
Outdoortemp.
Act.: 12.8 °C
Humidity Outdoor
Act.: 98.7% RH
```

```
Indoortemp
Act.: 17.2 °C
Humidity indoor
Act.: 55.7 % RH
```

Status enthalpy control

```
Override cool Recovery
due to Enthalpy:
On
```

Chapter 11 **Air control**

Pressure control SAF and EAF

When using pressure or flow controlled fans, the setpoint can be outdoor compensated.

The compensation has the default value 0 Pa, i.e. no compensation is added. The compensation is linear between the setting points. The compensation can be positive or negative.

The same compensation normally applies to both fans. Using E tool, you can choose to compensate only the supply air fan.

The same compensation is applied to both Normal and Reduced speed. Therefore, you should be careful when you use the function so the pressure does not becomes too low or even negative when running Reduced speed.

Depending on the choice of fan control, different combinations of the menus below will be shown.

Pressure control SAF. There are corresponding menus for EAF.

```
Pressure contr. SAF
Actual: 480 Pa
Setp.:  490 Pa    →
```

Submenu Setpoint

```
Pressure contr. SAF
Setp 1/1: 490 Pa
Setp 1/2: 300 Pa
```

Submenu Outdoor compensation

```
Outdoor comp. setp.
  -20 °C = -50 Pa
   10 °C =   0 Pa
Act. comp:  -5 Pa
```

Flow control SAF. There are corresponding menus for EAF.

```
Flow control SAF
Actual: 1800 m3/h
Setp.: 2000 m3/h    →
```

Submenu Setpoint

```
Flow control SAF
Setp 1/1: 2000 m3/h
Setp 1/2: 1000 m3/h
```

Submenu Outdoor compensation

```
Outdoor comp. setp.
  -20 °C = 0.0 m3/h
   10 °C = 0.0 m3/h
Act. comp: 0.0 m3/h
```

Manual frequency control SAF. There are corresponding menus for EAF.

```
Frequency control
manual SAF
Output: 75%    →
```

Submenu Setpoint

```
Frequency control
manual SAF
Output 1/1: 75%
Output 1/2: 50%
```

Submenu Outdoor compensation

```
Outdoor comp. outp.
  -20 °C = 0 %
   10 °C = 0 %
Act. comp: 0 %
```

CO2 / VCO

```
CO2
 Actual:920ppm
Setp:850pm
```

Chapter 12 **Humidity control**

Humidity control can be configured as Humidification, Dehumidification or both Humidification and Dehumidification.

Two humidity sensors can be connected, a room sensor for control and an optional duct sensor for maximum limiting. The limit sensor can be omitted.

The humidity control is handled by a PI-controller.

The humidity sensors must give 0…10V for 0…100% RH.

Humidity sensor room

```
Humidity room
Actual: 51.9% RH
Setp:   50.0% RH
```

Humidity sensor duct

```
Humidity duct
   Actual: 72.2% RH
Max limit: 80.0% RH
  Hyst.:   20.0% RH
```

Chapter 13 **Time settings**

General

Corrigo has a year-base clock function. This means that a week-schedule with holiday periods for a full year can be set. The clock has an automatic summer- winter-time changeover.

Individual schedules for each week-day plus a separate holiday setting. Up to 24 individual holiday periods can be configured. A holiday period can be anything from one day up to 365 days. Holiday schedules take precedence over other schedules.

Each day has up to two individual running periods. For two-speed fans and pressure controlled fans there are daily individual schedules for normal speed and reduced speed, each with up to two running periods.

Up to 5 digital outputs can be used as timer controlled outputs. Each with individual week-schedules with two activation periods per day. These outputs can be used to control lighting, doorlocks etc.

```
Time/Date
Timer Normal speed
Timer Reduced speed
Extended running
Timer output 1    →
Timer output 2    →
Timer output 3    →
Timer output 4    →
Timer output 5    →
Holidays          →
```

13.1 Time / Date

This menu shows and permits the setting of time and date.

Time is shown in 24 hour format.

Date is shown in the format YY:MM:DD

```
     Time: 18:21
   Date: 04-08-04
Weekday: Wednesday
```

13.2 Timer Normal speed

There are 8 separate setting menus, one for each weekday and one extra for holidays. Holiday schedules take precedence over other schedules.

For 24 hour running, set a period to 0:00 – 24:00.

To disable a period, set it to 0:00 – 0:00. If both periods of a day are set to 0:00 – 0:00, the unit will not run at 1/1-speed that day.

```
Normal speed
Monday
Per 1: 07:00 – 16:00
Per.2: 00:00 - 00:00
```

If you want to run the unit from one day to another, e. g. from Mon 22:00 to Tue 09:00, the desired running time for both days must be entered.

```
Normal speed
Monday
Per 1: 07:00 – 16:00
Per.2: 22:00 - 24:00
```

```
Normal speed
Tuesday
Per 1: 00:00 – 09:00
Per.2: 00:00 - 00:00
```

13.3 Timer Reduced speed

These settings will be ignored if single speed fans are configured.

Should periods for normal speed and periods for reduced speed overlap, normal speed takes precedence.

There are 8 separate setting menus, one for each weekday and one extra for holidays. Holiday schedules take precedence over other schedules. For 24 hour running, set a period to 00:00 – 24:00. To disable a period, set it to 00:00 – 00:00. If both periods of a day are set to 00:00 – 00:00, the unit will not run at Reduced speed that day.

```
Reduced speed
Sunday
Per 1: 10:00 – 16:00
Per.2: 00:00 - 00:00
```

13.4 Extended running

Digital inputs can be used to force the unit to start although the timer says the running mode should be “Off”.

For 2-speed fans and pressure/flow controlled fans, inputs for normal speed and reduced speed can normally be used.

The unit will run for the set time. If the running time is set to 0 the unit will only run as long as the digital input is closed.

```
Extended running
60 min
Time in ext. Running
0 min
```

13.5 Timer outputs 1…5

Up to 5 digital outputs can be used as timer controlled outputs. Each with individual week-schedules with two activation periods per day. Each output has 8 separate setting menus, one for each weekday and one extra for holidays. Holiday schedules take precedence over other schedules.

Only the time channels which have been configured, i.e. have been wired to a digital output, will be shown.

```
Timer output 2
Wednesday
Per.1: 05:30 – 08:00
Per.2: 17:00 – 23:00
```

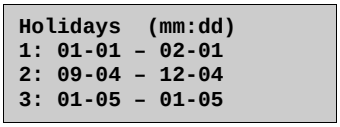
If the function Recirculation has been configured (see 5.1.11), Timer output 5 can be used for controlling start/stop of the Recirculation function.

13.6 Holidays

Up to 24 separate holiday periods for a full year can be set.

A holiday period can be any number of consecutive days from one and upwards. The dates are in the format: MM:DD.

When the current date falls within a holiday period, the scheduler will use the settings for the weekday “Holiday”.



Chapter 14 **Manual / Auto**

General

In this menu the running mode of all the configured output signals and a number of control functions can be manually controlled. This is a very handy feature which simplifies the checking of individual functions in the Corrigo.

The running mode for the whole unit is set in the menu Running mode. See section 9.1.

The supply air controller's output signal can be manually set (Manual/Auto) to any value between 0 and 100%. The temperature output signals will change accordingly if they are in Auto mode. It is also possible to manually control each of the temperature output signals individually.

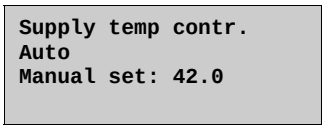
All the configured digital outputs can be set to On, Off or Auto.

Since leaving any of the outputs in manual control will disrupt the normal control, an alarm will be generated as soon as any output is set to a manual mode.

Since the menus vary according to the configuration of the outputs only the most common ones will be shown here. For the digital signals you can normally choose between Auto and On and Off or similar words indicating the two possible manual states of the digital output.

Manual / Auto

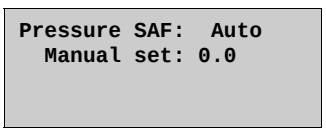
Supply air controller running mode. Can be set to Auto, On or Off. In manual mode the output signal can be set 0…100%. The outputs Y1, Y2 and Y3, if in Auto-mode, will follow the signal according to the set split values.

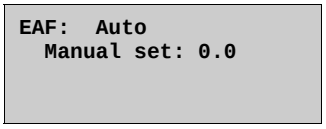


Start signal SAF and EAF

Can be set to Auto, Manual 1/1-speed, Manual 1/2-speed and Off. Manual 1/2-speed is not valid for single speed fans.

With pressure controlled fans you get the following menu: Can be set to Auto, Manual normal, Manual reduced and Off. In Manual mode the output signal can be set 0…10 V.





Y1 heating output

```
Heating
Auto
Manual set: 0.0
```

Y2 heat exchanger

```
Exchanger
Auto
Manual set: 0.0
```

Y3 cooling

```
Cooling
Auto
Manual set: 0.0
```

Humidification/dehumidification

```
Humidification/Dehumidi
fication
Auto
Manual set: 0%
```

Circulation pumps: Heating, Exchanger and Cooling

```
P1-Heating
Auto
P1-Exchanger
Auto
```

Dampers: Fresh air, Recirculation air, Exhaust air and Fire dampers

```
Fresh air damper
Auto
```

Extra control circuit

```
Extra ctrl. unit
Auto
Manual set: 0.0
```

Extra sequence

```
Extra sequence Y4
Auto
Manual set: 0.0
```

Chapter 15 **Settings**

In this menu group all settings for all activated functions should be available. The menu group is only available when logging on as System. Depending on what choices have been made during configuration, some of the alternatives in this menu group may not be shown.

Settings

```
Control temp
Control pressure
Control flow
Control humidity
Control CO2
Control extra unit
Alarm settings
```

15.1 Control temp

Supply air controller

```
Supply air control
P-band:  33.0 °C
 I-time: 100.0 sec
```

The set P-band for the supply air controller is for the whole controller signal. This means that the P-band for each sequence is proportionate to the split percentage values given to sequences.

For example: P-band for the supply air controller is set to 25K. The split is set so that cooling gets 0…20% = 20%, the exchanger gets 30…50% = 20% and the heater gets 50…100% = 50%. =50%.

The individual P-bands will then be:

Chiller 20% of 25°C = 5°C

Exchanger: 20% of 25°C = 5°C

Heating: 50% of 25°C = 12.5°C

The remaining 2.5°C are the neutral zone between cooling and exchanger.

The split values are set in the configuration submenu *Other parameters.*See section 16.24.6.

```
If cascade control
max/min supply setp.
Max: 30°C
Min: 12°C
```

Room controller

```
Room control
P-band: 100.0 °C
 I-time: 300.0 sec
```

Extract air controller

```
Extract air control
P-band: 100.0 °C
 I-time: 300.0 sec
```

Shutdown mode

```
Shutdown mode
P-band: 100.0 °C
 I-time: 100 sec
```

Frost protection temperature

```
Frost protection
temperature ->
```

```
Frost protection
Active
Setp shutdown: 25°C
P-band active:  5°C
```

```
Fast stop at
frost-protection alarm
Yes
```

Setp shutdown is the shutdown mode setpoint.

P-band active 5°C means that the frost protection controller will start overriding the heating output when the frost protection temperature is less than 5 degrees above the set frost alarm limit. The default alarm limit is 7°C. It can be changed in the menu Settings/Alarm settings/Alarm limits/Alarm limit frost protection.

Exchanger de-icing

```
De-iceing
P-band:  100 °C
 I-time: 100 sec
```

15.2 Control pressure

Pressure control SAF

```
Pressure control SAF
P-band:   500 Pa
 I-time:   60 sec
Min Output: 0 %
```

Pressure control EAF

```
Pressure control EAF
P-band:   500 Pa
 I-time:   60 sec
Min Output: 0 %
```

15.3 Control flow

Flow control SAF

```
Flow control SAF
P-band:  1000 m3/h
 I-time:   60 sec
Min Output: 0 %
```

Flow control EAF

```
Flow control EAF
P-band:  1000 m3/h
 I-time:   60 sec
Min Output: 0 %
```

15.4 Humidity control

```
Control humidity
P-band: 100.0 %RH
 I-time: 300.0 sec
```

15.5 Control Extra unit

```
Control extra
unit
P-band:  33.0 °C
I-time: 100.0 sec
```

15.6 Alarm settings

Alarm settings

```
Alarm limits         →
Alarm delays         →
Restore alarm        →
```

15.6.1 Alarm limits

Alarm limits, supply air

```
Al. lim. supply air
Control dev:  10.0 °C
High temp:    30.0 °C
Low temp:     10.0
```

Alarm limits, extract air

```
Al. lim. extract air
High temp:    30.0 °C
Low temp:     10.0 °C
```

Alarm limits, room

```
Al. lim. room air
High temp:    30.0 °C
Low temp:     10.0 °C
```

Alarm limit, frost protection

```
Alarm limit frost
protection
 7.0 °C
```

Alarm limit, pressure

```
Control dev SAF
40.0 Pa
Control dev EAF
40.0 Pa
```

Alarm limit Humidity

```
Control deviation
humidity
10 %
```

Alarm limit, exchanger efficiency

```
Low efficiency
50.0 %
```

Service alarm filter

```
Service alarm
(Filter alarm)
Time until alarm
Activates: 0 month
```

15.6.2 Alarm delays

Alarm delay, supply air

```
Al. del. supply air
Control dev: 30 min
High temp:    5 sec
Low temp:     5 sec
```

Alarm delay, extract air

```
Al. del. extract air
High temp:   30.0 min
Low temp:    30.0 min
```

Alarm delay, room

```
Al. del. room air
High temp:   30.0 min
Low temp:    30.0 min
```

Alarm delay, frost protection

```
Alarm delay
Frost prot.: 0 sec
Frost risk:  0 sec
```

Alarm delay control SAF and EAF

```
Alarm delay control
dev. pressure
SAF: 30     min
EAF: 30     min
```

Alarm delay, Humidity

```
Alarm delay control
deviation humidity
30  Min
```

Alarm delay, exchanger efficiency

```
Low efficiency
30 min
```

Alarm delay, fan malfunction

```
Alarm delay malfunc.
SAF:  120 sec
EAF:  120 sec
```

Alarm delay, pump malfunction

```
Alarm delay malfunc.
P1-Heating:     5 sec
P1-Cooling:     5 sec
P1-Exchan.:    20 sec
```

Alarm delay, misc.

```
Alarm delay
Filter mon.:  180 sec
Flow switch:    5 sec
Frost prot.:    0 sec
```

Ext. Frost prot. DI refers to the digital input signal Deicing Heat exchanger.

Alarm delay, misc. 2

```
Alarm delay
   Deicing DI: 0 sec
   Fire alarm: 0 sec
   Ext. alarm: 0 sec
```

Frost protection DI refers to the digital input signal De-icing thermostat exchanger.

Alarm delay, misc. 3

```
Alarm delay
   Elec. heat:   0 sec
 Sensor error:   5 sec
Rot.sent.exch:  20 sec
```

15.6.3 Restore alarm

```
Service alarm
(filter alarm)
Time counter set to
zero: No
```

15.7 Save and restore settings

```
Restore factory
settings: No
Restore user settings:
 No
```

In this menu, it is possible to restore all parameters to their factory settings or to the user settings they were saved as earlier, see below.

```
Save user settings: No
```

The current configuration can be saved in a separate memory area and can later be restored using the previous menu, Restore user settings.

Chapter 16 **Configuration**

Start by logging on at System level. See chapter 8.

Move the marker using the DOWN and UP buttons until it is opposite the menu **Configuration** and press RIGHT.

The configuration main menu is shown (different menus are visible depending on the configured inputs and outputs).

```
Inputs/Outputs
Control function
Fan control
Extra control unit
Extra sequence Y4
Heating
Exchanger
Cooling
Pump control
Free cooling
Support control
CO2/VOC control
Fire function
Humidity control
Exchanger de-icing
Cooling recovery
Enthalpy control
Min lim. dampers
External setpoint
Run ind/Motor prot.
Actuator type
Actuator run time
Step controllers
Recirculation
Alarm settings
Communication
Other parameters System
```

16.1 Inputs and outputs

```
Analogue inputs
Digital inputs
Universal inputs
Analogue outputs
Digital outputs
```

General

Free configuration

Any control signal can be bound to any input/output, the only restriction being that digital signals cannot be bound to analogue inputs and vice versa. It is up to the user doing the binding to make sure that activated functions are bound to appropriate signals.

Delivery setting

On delivery all the physical inputs and outputs have already been bound to a signal.

The delivery settings are suggestions only and can easily be changed.

16.1.1 Analogue inputs AI

```
AI1
Sign: Outdoor temp
Raw value: 18,4
Compensation:0,0
```

All analogue inputs are for PT1000 or 0-10 Volts.

Input signals can be compensated for example for wiring resistance.

The Raw value will show the actual uncompensated input value.

If inputs have been assigned to pressure or flow control of fans, alternatively humidity or CO_2 control, the following menus will appear:

```
SAF Pressure at
 0V:  0.0 Pa
10V:500.0 Pa
Filter factor: 0.2
```

```
CO2 at
 0V:  0.0 ppm
10V: 2000 ppm
Filter factor: 0.2
```

Set the parameter values that should correspond to the input signal levels 0 V and 10 V.

The filter factor is the damping you want the program to work with in order to reduce the influence of potential signal fluctuations on the sensor input.

16.1.2 Digital inputs DI

```
DI1
NO/NC: NO Signal:
Filter alarm 1
Status: Off
```

To simplify adaptation to external functions, all digital inputs can be configured to be either normally open, NO, or normally closed, NC.

The inputs are as standard normally open, i. e. if the input is closed, the function connected to the input in Corrigo is activated.

Be careful when changing the input from NO to NC since some digital functions can be configured to either NO or NC themselves. For example, you can choose if the Fire alarm input should be activated when it is closed or opened. Therefore, there is a risk that the signal is changed twice and the result is the opposite of the desired.

16.1.3 Universal inputs UI

On the largest hardware version, E28 there are universal inputs. These can individually be configured as either analogue inputs or as digital inputs. When configured as analogue inputs they can be bound to any of the analogue signals described under Analogue signals.

When configured as digital inputs they can be bound to any of the digital signals described under Digital signals.

```
UI1                  →
Choose AI or DI sign
AI sign: SAF pressure
DI sign: Not used
```

After choosing AI or DI signal (the unused alternative must be set to *Not active*) there are sub-menus with settings. These menus are accessed by pressing RIGHT.

```
Universal AI1
Sign: SAF pressure
Raw Value:8.5
Compensation: 0.0
```

```
Universal DI1
NO/NC: NO Signal
Not used
Status: Off
```

To simplify adaptation to external functions, all universal inputs configured as digital inputs can be set to be either normally open, NO, or normally closed, NC.

The inputs are as standard normally open, i. e. if the input is closed, the function connected to the input in Corrigo is activated.

Be careful when changing the input from NO to NC since some digital functions can be configured to either NO or NC themselves. For example, you can choose if the Fire alarm input should be activated when it is closed or opened. Therefore, there is a risk that the signal is changed twice and the result is the opposite of the desired.

16.1.4 Analogue outputs

Analogue outputs are 0…10 V DC.

```
AO1
Sign: Y1-Heating
Auto
Value: 0.0 V
```

Analogue outputs can be set in run mode Auto, Manual or Off.

16.1.5 Digital outputs

```
DO1
Signal: SAF 1/1-speed
Auto
Status: On
```

Digital outputs can be set in run mode Auto, Manual-On or Manual-Off.

16.2 Control function

```
Control function
Mode:
Supply air control
```

There are 6 different functions to choose from:

1. Supply air control.
2. Outdoor-temperature compensated supply air control.
3. Cascaded room temperature control
4. Cascaded extract air temperature control.
5. Outdoor temperature dependent switching between outdoor compensated supply air temperature control and room temperature control
6. Outdoor-temperature controlled switching between Outdoor-temperature compensated supply air control and Cascaded extract air temperature control.

For detailed description of the control modes, see section 5.1.1 Control modes.

In control modes 5 and 6, there is a submenu for setting of the change-over outdoor temperature.

```
Outdoor temp for
control mode change
 13°C
```

16.3 Fan control

```
Fan control
1-speed
```

Choose between Single-speed, Two-speed, Pressure control, Flow control, Frequency manual (fixed output), Frequency external control, SAF with EAF slave, or SAF with EAF flow control.

For detailed description of fan control alternatives, see section 5.4 Fan control.

Flow control

If flow control has been configured, there is a submenu for setting of calculation parameters for conversion of pressure to flow. There are two menus, one for SAF and one for EAF.

```
SAF flow control
factors
K-constant: 100
X-constant: 0.50
```

For more detailed description, see the section Air flow control under 5.4.1 Pressure control.

SAF with EAF slave

If SAF with EAF slave has been configured, there is a submenu for setting the CAV factor, a factor which determines the extract air fan output in relation to the supply air fan output.

```
EAF CAV factor:  1.00
```

For more detailed description, see the section SAF with EAF slave under 5.4.1 Pressure control.

SAF with EAF flow control

If SAF with EAF flow control has been configured, there are submenus for setting the flow calculation factors for SAF and EAF, and the CAV factor for EAF.

```
SAF flow control
factors
K-constant: 100
X-constant: 0.50
```

```
EAF flow control
factors
K-constant: 100
X-constant: 0.50
```

```
EAF CAV factor:  1.00
```

For more detailed description, see the section SAF with EAF flow control under 5.4.1 Pressure control.

Crosswise interlock between fans

Crosswise interlock means that if one of the fans stops running, the other fan will automatically stop as well.

```
Crosswise interlock
between SAF and EAF
No
```

16.4 Extra control circuit

The extra control circuit can be configured to be either constantly active or to be active only when the regular control circuit is active.

```
Mode extra unit
Running if
unit runs
```

The extra control circuit can be configured to be either a heating or a cooling circuit.

```
Control mode extra
unit:
Heating
```

16.5 Extra sequence Y4

Extra sequence Y4 can be configured to one of the following alternatives: Active, Active with cooling recovery, Active with enthalpy control and Active with both cooling recovery and enthalpy control.

```
Mode Extra Seq-
uence Y4
Not active
```

16.6 Heating coil

```
Heating
water
```

The heater can be set to Water, Electric, Water/Electric or Not used.

For detailed description of heater alternatives, see section 5.1.2 Heater types.

16.7 Exchanger

```
Exchanger
Rot. Exch
```

The heat exchanger unit can be set to one of the following alternatives:

- Plate exchanger

- Rotating exchanger
- Liquid connected exchanger
- Mixing dampers
- Not connected
- Damper limiting for minimum fresh air percentage is settable 0…100%.

In the submenu parameters for outdoor temperature control of exchanger can be set.

```
Outd. temp control of
exch:       Off
Outd. temp start: 10°C
Diff. stop: 0.2°C
```

For detailed description of exchanger alternatives, see section 5.1.3 Heat exchanger.

16.8 Chiller

```
Cooling
Water
```

Select chiller type: Water, DX, DX with exchanger control or Not used.

For detailed description of DX-cooling, se section 5.1.4 Step controllers.

If DX cooling has been configured, there are submenus for setting of certain operation parameters.

Min limit lowering

If DX cooling is used in combination with room or extract air control, the supply air temperature minimum limit value can be lowered to give smoother (more continuous) running of the chillers. The set lowering of the limit value is activated when the DX cooling is running.

```
Lowering of min
limit for supply air
control on active
DX cooling: 5.0°C
```

This parameter is also used for setting the lowering of the cooling setpoint when running DX cooling with exchanger control.

See 5.1.4.

Blocking the DX cooling at low outdoor temp

Outdoor temperature dependent blocking of DX cooling is individually settable for each cooling step. If the outdoor temperature is below the set value, it is not possible to activate the cooling step. The function has a 1K hysteresis, i.e. if a cooling step is blocked, it can only be activated again when the outdoor temperature has risen to 1K above the set value.

```
Block DX-cooling,
step1, at outdoor temp.
lower than  13.0 °C
```

Blocking of DX cooling on cooling pump alarm

DX cooling can be blocked on activation of the cooling pump alarm.

```
Block DX-cooling on
alarm
”Run error P1-
cooler”:No
```

16.9 Pump control

```
P1-Heating          →
P1-Exchanger        →
P1-Cooling          →
```

In these menus the parameters for pump control are set.

If, for any of the control circuits, no output is configured for pump control these settings will be ignored.

P1 Heating

```
Pump stop: Yes
Stop delay: 5 min
Outd. Temp stop: 10°C
Differential: 1.0°C
```

P1 Exchanger

```
P1-Exchanger
Stop delay: 5 min
```

P1 Cooling

```
P1-Cooling
Stop delay: 5 min
```

For a detailed description of pump functions, see the section Pump control.

16.10 Free cooling

```
Free cool active:Yes
Outd. temp activation
22.0°C
```

```
Outd. Temp night
        High: 18.0°C
         Low: 10.0°C
Room temp min 18.0°C
```

```
Hour for start/stop
Free cooling
Start: 0
Stop: 7
```

```
Time to block heat
output after
free cooling
60    min
```

```
Fan output
when free cooling
SAF:  0   %
EAF:  0   %
```

```
Outdoor sensor
placed in intake
channel
No
```

For detailed description, see section 5.1.6 Free cooling.

16.11 Support control

Note: If support control without EAF (extract air fan) is selected, a recirculation damper must be used. See more in section 5.1.5.

```
Support control
Active: Yes
EAF running during
support contr: Yes
```

Minimum running time

```
Min. run time for
support ctrl: 20 min
```

For detailed description, see section 5.1.5 Support control.

16.12 CO2/VOC Demand control

```
CO2/VOC active
Never
Type: Mixing dampers
Min. time: 20 min
```

```
Activation level
1/2-speed: 800  ppm
1/1-speed: 1000 ppm
     diff: 160  ppm
```

For detailed description, see the section Demand control.

16.13 Fire function

Fire dampers are normally configured to open on fire alarm. However, via the display you can configure them to be normally open instead.

In Corrigo controllers of generation 1, it was possible to choose whether the extract air fan should be activated on fire alarm or if both fans should be stopped.

For generation 2 controllers, you can use E tool to configure the air handling unit's running mode on fire alarm. The following choices are possible: Stopped, continuous run, run via normal start/stop conditions, only supply air fan in operation, only extract air fan in operation.

For compatibility reasons, the old function has not been removed in generation 2 controllers. This means that old configuration files can be used in new Corrigo controllers as well. If the running mode in the new application has been set to another value than Stopped, this value will take precendence over the value in the old application.

There is a digital input for detection of open and closed position of the fire dampers.

All dampers must be wired to the same output in order to get correct results.

```
Fire damper function
Not active
Operation when alarm
Stopped
```

Select if fire alarm should be normally closed or normally open and activation of fire damper exercising if the unit should be stopped or not: No, Yes unit running-->, Yes unit stopped-->, -->,

```
Fire alarm input
Normally open
Damper exercise
No
```

Set the parameters for damper exercise in the submenu.

```
Damper exercise
Running time: 90 sec
Interval in days: 1
Hour for exerc.: 00
```

Running time is the time the damper actuator needs to open or close.

Hour for exercise is the hour of the day at which you want the function to be run.

For detailed description of damper exercising, see the section Damper control.

16.14 Humidity control

Humidity control can be configured as either humidification or dehumidification or as combined humidification / dehumidification. These settings are for the digital output Humidification/Dehumidification.

```
Humidity control
Humid-/Dehumidificat
Start limit: 15%
Stop limit: 5%
```

For a detailed description, see the section Humidity control.

16.15 Exchanger de-icing

```
Exchanger de-icing
Yes
```

De-icing parameters

```
Setp.De-icing:-3.0°C
   Hysteresis: 1.0 °C
Stoptemp SAF:-10.0°C
   Min. run time: 5 min
```

For detailed description of exchanger alternatives, see section 5.1.3 Heat exchanger.

16.16 Cooling recovery

```
Cooling recovery
Off
Cooling limit: 0.0°C
```

Cooling limit is the difference in temperature between extract air and outdoor air.

For details, see section 5.1.7 Cooling recovery.

16.17 Minimum limit dampers

```
Min limit dampers
Active No
Min limit.: 5%
```

For detailed description of exchanger alternatives, see section 5.1.3 Heat exchanger.

16.18 Enthalpy control

```
Cooling recovery run
when enthalpy is
greater outdoor than
indoor : Active
```

For a more detailed description, see section 5.1.8 Enthalpy control.

16.19 External setpoint

An external setpoint device, for example TBI-PT1000 or TG-R4/PT1000 can be connected. The setpoint device must follow the PT1000 resistance curve. The setting range can be restricted

```
External setpoint
Active: No
Min setp.: 12.0°C
Max setp.: 30.0°C
```

For details, see section 5.1.10 External setpoint.

16.20 Run indication / Motor protection

Digital input signals are used to supervise fans and pumps. They can be configured either for indication of the motor running or for monitoring of motor protection contacts.

An input configured for run indication should normally be closed during operation.

Open input when the motor is running, i.e. motor control output is activated, will generate an alarm.

For supply air fans and extract air fans, there is also a conflict alarm, i. e. an alarm if the run indication input is closed even though the motor control output is not activated. See alarm 33 External activ. SAF and alarm 34 External activ. EAF in the section Alarm configuration.

An input configured as motor protection should be normally open, i. e. closed contact when the motor is running, i.e. motor control output is activated, will generate an alarm.

```
Run ind./Motor prot
SAF: Motor protection
EAF: Motor protection
```

```
Run ind./Motor prot
P1 Heat: Motor
protection
P1 Exch: Motor
protection
P1 Cool: Motor
protection
```

When running frequency controlled fans, the pressure signal from each respective fan's pressure transmitter is normally used as run indication signal. If the pressure falls below the set value during normal operation, a malfunction alarm is activated.

```
Min pressure for
run indication
SAF:  25.0 Pa
EAF:  25.0 Pa
```

Alarm from frequency converter

When running frequency controlled fans, you sometimes want to use both a pressure signal from a pressure transmitter and a digital alarm signal from a frequency converter. An analogue input for a pressure transmitter *and* a digital input for SAF or EAF indication must then be configured. The setting Run indication/Motor protection SAF or EAF must be set to Motor protection. A fan alarm will be activated both when there is no pressure signal from the pressure transmitter, and when the digital signal Indication SAF or EAF is activated.

16.21 Actuator type

Choose output signals to the actuators connected to the analogue control outputs: 0…10 V DC, 2…10 V DC, 10…0 V DC or 10…2 V DC.

```
Actuator type
Y1 Heating: 0-10V
Y2 Exchan.: 0-10V
Y3 Cooling: 0-10V
```

```
Actuator type
      SAF: 0-10V
      EAF: 0-10V
    Split: 0-10V
```

```
Actuator type
Y6 Humidity:    0-10V
Extra unit:     0-10V
Y1 Heat/Y3 cool 0-10V
```

```
Actuator type
Y4 Extra seq.:   0-10V
```

Note: Note that although many manufacturers state 0…10 V DC as control signal, for many actuators the actual control signal is more often than not 2…10 V DC. Check the actuator documentation carefully. If uncertain, choose 0…10V DC. Although control might be less accurate, it will ensure that the valve always can be driven to its fully opened and fully closed positions.

16.22 Running time, 3-pos. actuators

These parameters have no function if analogue actuators are configured.

The values are used to determine the control parameters for 3-position actuators.

It is important to set correct values since incorrect values lead to sloppy control.

```
Actuator run time
  Heating:   255 sec
  Exchanger: 255 sec
  Cooling:   255 sec
```

16.23 Step controllers

```
Step contr. heating  →
Step contr. Cooling  →
```

16.23.1 Step controller heating

Step controller Heating can be set to sequential or binary.

```
Step contr. heating
Sequential           →
```

Step controller Heating activation levels for sequential control.

For binary control the activation levels are calculated by the controller depending on the number of steps involved

```
Start step 1: 10  %
Stop step 1:   5  %
Start step 2: 45  %
Stop step 2:  40  %
```

```
Start step 3: 70  %
Stop step 3:  65  %
Start step 4: 95  %
Stop step 4:  90  %
```

Control parameters. Number of groups is used to calculate activation levels for binary control. Hyst is the switching differential used for each step when running binary control.

```
Chiller groups: 4
Minimum on/off-
 time: 60 sec
Hyst: 0.5 %
```

16.23.2 Step controller cooling

Step controller Cooling can be set to sequential or binary.

```
Step contr. cooling
Sequential     →
```

Step controller Cooling activation levels for sequential control.

For binary control the activation levels are calculated by the controller depending on the number of steps involved

```
Start step 1: 10  %
Stop step 1:   5  %
Start step 2: 50  %
Stop step 2:  45  %
```

```
Start step 3: 95  %
Stop step 3:  90  %
```

Control parameters. Number of groups is used to calculate activation levels for binary control. Hyst is the switching differential used for each step when running binary control.

```
Chiller groups: 3
Minimum on/off-
 time: 60 sec
Hyst: 0.5 %
```

When DX cooling is used in conjunction with pressure controlled or flow controlled fans it is possible to block DX cooling if the supply air fan control signal falls below a preset values. The blocking level is individually settable for each DX cooling step.

```
At lower SAF-output
block step 1:  0 %
block step 2:  0 %
block step 3:  0 %
```

For a more detailed description, see section 5.1.4 Step controllers.

16.23.3 Step controllers Change-over

The digital output signals Heating/Cooling 1, Heating/Cooling 2 and Heating/Cooling 3 are used for step controllers during Change-over control (see section 5.1.12). They have the same functions as other step controller outputs, but are set to either heating or cooling depending on whether heating or cooling is required. In other words, when heating is active, they will follow the settings for Heating 1-3 and when cooling is active they will follow the settings for Cooling 1-3.

16.24 Recirculation

Recirculation is a function for distributing the air in the room using the supply air fan. The function can be used even when there is no heating or cooling demand. When using recirculation control, the extract air fan stops and a recirculation damper opens which allows the air to circulate through the unit.

```
Enable temp control
when recirculation:
No
```

Recirculation control can be configured as either air circulation (temperature control inactive) or air circulation with temperature control. (Only heating, only cooling or both heating and cooling). Recirculation control has its own setpoint. However, the other settings are the same as for normal operation, i. e. if normal operation has been configured as room control, room control will also be used during recirculation.

```
End recirculation
control when room temp.
exceeds:
25.0°C
```

If the room temperature rises above the set limit value, recirculation will be stopped.

```
Enable free cool when
recirculation: No
```

To lower the temperature, it is possible to configure free cooling to be used during recirculation, if the conditions for free cooling are fulfilled.

```
Use extra time group 5
to start recirculation:
 No
```

Recirculation is activated either via a digital input signal or by connecting it to Timer output 5.

16.25 Alarm setting

Permits configuration of all alarms.

Select the appropriate alarm number (from the alarm list). The alarm text for the alarm will be displayed and the alarm priority can be set: A-alarm, B-alarm, C-alarm, D-alarm or not active. The extra stop function gives, for each alarm, the option to stop or not stop the unit on alarm activation.

```
Run Error supply air
Priority: B-alarm
Extra stop function
Active
```

Alarm text

The alarm text that should be shown in the display when there is an alarm can be changed using E tool. For more information, see the E tool manual.

Alarm list

The alarm text and priority columns show the factory set values.

	Alarm text	Pri	Description
1	Run Error Supply Air Fan	B	Malfunction Supply air fan
2	Run Error Extract Air Fan	B	Malfunction Extract air fan
3	Run Error P1-Heater	B	Malfunction pump, Heating circuit
4	Run Error P1-Cooler	B	Malfunction pump, Cooling circuit
5	Run Error P1-Exchanger	B	Malfunction pump, Liquid connected exchanger
6	Filter guard	B	Filter guard pressure switch activated
7	Flow guard	B	Flow guard activated
8	External frost guard	A	External Frost protection thermostat activated
9	Deicing pressure guard	-	Exchanger de-icing pressure switch activated
10	Fire alarm	A	Fire alarm activated
11	External switch	C	External switch activated
12	External alarm	B	External alarm activated
13	Supply Air control error	B	Supply air temp deviates too much from the setpoint for too long
14	Humidity control error	-	The room humidity deviates too much from the setpoint.
15	High supply air temp	B	Supply air temp too high
16	Low supply air temp	B	Supply air temp too low
17	Supply air temp max	-	Maximum limiting of supply air temp active
18	Supply air temp min	-	Minimum limiting of supply air temp active
19	High room temp	B	Room temp too high during room temp control
20	Low room temp	B	Room temp too low during room temp control
21	High extract air temp	B	High extract air temp during extract air control
22	Low extract air temp	B	Low extract air temp during extract air control
23	Electric heating is overheated	A	Heater high temperature limit switch activated
24	Frost risk	B	Frost protection function is overriding the control of the heater output
25	Low frostguard temp	A	Frost protection temperature below frost limit value

	Alarm text	Pri	Description
26	Low efficiency	B	Heat exchanger efficiency below limit value
27	Sensor error Outdoor temp	B	Malfunction of connected sensor
28	Analogue deicing	-	Exchanger de-icing activated by de-icing sensor
29	Rotation guard exchanger	B	Exchanger rotation sentinel alarm activated
30	Fire damper is out of operation	B	Fire damper exercise test failed
31	Supply Air Fan control error	-	Supply air pressure deviates too much from the setpoint for too long.
32	Extract Air Fan control error	-	Extract air pressure deviates too much from the setpoint for too long.
33	Supply Air Fan external operation	C	SAF run-signal received when unit is stopped
34	Extract Air Fan external operation	C	EAF run-signal received when unit is stopped
35	Ventilation Manual mode	C	The unit is shut down
36	Manual supply air control	C	Supply air temp controller in manual control
37	Manual supply Air Fan mode	C	Supply air fan in manual control
38	Freq. SAF Manual	C	Signal to SAF frequency converter in manual control
39	Manual Extract Air Fan mode	C	Extract air fan in manual control
40	Freq. EAF Manual	C	Signal to SAF frequency converter in manual control
41	Heating Manual Manual	C	Heating output in manual control
42	Manual exchanger control	C	Heat exchanger output in manual control
43	Manual cooler control	C	Cooling output in manual control
44	Manual P1-Heater	C	Heating circulation pump in manual control
45	Manual P1-Exchanger	C	Exchanger circulation pump in manual control
46	Manual P1-Cooler	C	Cooling circulation pump in manual control
47	Fire damp. Manual	C	Fire dampers in manual control
48	Internal battery error	A	Internal battery needs replacing
49	Sensor error Supply Air temp	B	Malfunction of connected sensor
50	Sensor error Extract Air temp	B	Malfunction of connected sensor
51	Sensor error Room temp 1	B	Malfunction of connected sensor
52	Sensor error Room temp 2	B	Malfunction of connected sensor
53	Sensor error Exhaust air temp	B	Malfunction of connected sensor
54	Sensor error Extra sensor	B	Malfunction of connected sensor
55	Sensor error SAF pressure	B	Malfunction of connected sensor

	Alarm text	Pri	Description
56	Sensor error EAF pressure	B	Malfunction of connected sensor
57	Sensor error Deicing temp	B	Malfunction of connected sensor
58	Sensor error Frost Protection temp	B	Malfunction of connected sensor
59	Sensor error CO_2	B	Malfunction of connected sensor
60	Sensor error Humidity Room	B	Malfunction of connected sensor
61	Sensor error Humidity Duct	B	Malfunction of connected sensor
62	Sensor error Extra unit temp	B	Malfunction of connected sensor
63	Sensor error External control SAF	B	Malfunction of connected sensor
64	Sensor error External control EAF	B	Malfunction of connected sensor
65	Sensor error SAF Pressure 2	B	Malfunction of connected sensor
66	Sensor error Humidity outdoor	B	Malfunction of connected sensor
77	Alarm Frequency converter SAF	A	Malfunction of frequency converter SAF
78	Alarm Frequency converter EAF	A	Malfunction of frequency converter EAF
79	Communication error Frequency SAF	C	Communication problem with Vacon NXL
80	Communication error Frequency EAF	C	Communication problem with Vacon NXL
81	Communication error Expansion unit 1	C	Communication problem with a controller connected to port2
82	Communication error Expansion unit 2	C	Communication problem with a controller connected to port2
83	Warning Frequency converter SAF	C	
84	Warning Frequency converter EAF	C	
85	Output in manual mode	C	Analogue or digital output in manual mode
86	Time for service	C	Time for service
87	Manual Y4-Extra Sequence control	C	Y4-Extra sequence in manual control

16.26 Communication

16.26.1 Modbus communication

Corrigo E can be connected to a network for Modbus communication. You do not need an activation code.

```
Modbus slave com-
munication, Port 1
Not Active
```

If Modbus communication is activated, you can set the address etc.

```
Modbus Address: 1
Speed: 9600 bps
Two stop bits:Yes
Parity:No
```

16.26.2 Function port 2

Units connected to port 2 can be set to Slave, Master, Expansion unit or Modbus master. A 2-port Corrigo is required. Port two is used for communication with the expansion units.

Slave

For connection to E tool.

```
Function Port 2
Slave
```

Master

For future use.

```
Function Port 2
Master
```

Modbus master

For control of up to two Vacon NXL frequency converters using Modbus communication. Miscellaneous alarms and indications can be read from the frequency converters. For a complete list of alarms, see the alarm list. For communication addresses, see the Corrigo variable list.

The Corrigo modbus settings are listed below. They cannot be changed and must also be set in the Vacon NXL frequency converters.

Modbus address:
Supply air fan = 1
Extract air fan = 2

Speed: 9600 bps
1 stop bit
No parity

```
Type of frequency
converter connected
via Modbus:
Vacon NXL
```

Expansion unit

In order to connect more I/Os to the Corrigo, port two is set as expansion unit (only Corrigo E controllers can be connected). It is possible to connect two units which gives a maximum of 28*3 = 84 inputs/outputs. The expansion controllers must have the addresses 241:1 and 241:2 respectively (ELA:PLA).

```
Expansion unit 1
None
Expansion unit 2
None
```

To initiate the expanded controllers, select ”Expansion unit” at start-up (see below). If the controller is not loaded with program version 3.0 or later, the initiation must be made via E tool (see the E tool manual). However, this requires that the controller hardware is of Corrigo generation 2 (-S). After initiating the expansion units and configuring the master controller, all inputs and outputs are available for configuration in the master controller under Configuration / Inputs/Outputs (the expansion controllers’ inputs/outputs are called Exp1/Exp2).

```
Ventilation
Heating
Boiler
Expansion Unit 1
Expansion Unit 2
```

16.26.3 Dial-up modem

With the help of a dial-up modem, Corrigo E can be connected to a supervisor EXO-system. We recommend the modem Modem56kINT485kit. The default password is exo.

```
DialUpModem: No
Number:
Password:
exo
```

16.26.4 Alarm forwarding via SMS

Via a connected GSM modem, Corrigo can send an alarm message to up to 3 different recipients. You do not need an activation code to use this function. When there is an alarm, Corrigo sends an alarm message to the first number on the list. The message consists of an alarm text, the unit name (the same text that is shown in the first row of the start display) and the time when the alarm occurred. If the recipient does not send an SMS within 5 minutes to confirm that the message has been received, Corrigo will send the message to the next number on the list.

```
SMS: Not Active
Nbr1:
Nbr2:
Nbr3:
```

16.27 Other parameters

A collection of different parameters that did not fit into any of the other menus.

16.27.1 Start and stop delays for the fans

Use start delay if you wish one of the fans to start before the other and for example if you wish to give the close-off dampers time to open before starting the fans. Use stop delay for example to create a cool-down period when using electric heating.

```
Delay SAF
Start:  60 sec
Stop:   30 sec
```

```
Delay EAF
Start:  0 sec
Stop:  30 sec
```

16.27.2 Retardation time

When switching two-speed fans from 1/1-speed to 1/2-speed there is a settable retardation time. The same time applies to both fans.

```
Retardation time
1/1-1/2speed: 10 sec
```

16.27.3 Heating at start-up and high speed blocking

At outdoor temperatures below the set value, the heating output will be forced to 100% before start-up.

Two speed fans and pressure controlled fans can be blocked from using high speed at outdoor temperatures lower than the set value. This function should not be combined with the function ”Outdoor compensation of pressure setpoint”. See the section Demand control.

Both functions need an outdoor temperature sensor.

```
Outd.temp for
heat start:  3.0°C
Blocking of
 1/1-speed:  -10°C
```

16.27.4 Start delay exchanger

```
Startdelay Exch.
0    sec
```

16.27.5 Exchanger to 100% at start and alarm delay at start

To minimise the risk of freeze-up problems, the heat exchanger can be forced to maximum capacity for the set time at start-up.

To eliminate the risk of, for example, fan pressure alarms at start-up, all alarm functions can be suppressed for the set time.

```
Exch 100% at start
2 sec
Alarm delay at start
60 sec
```

16.27.6 Split controller signal

Splits the Controller output (Heating Controller Output signal = HCOut) between the analogue temperature control output signals Y1, Y2 and Y3 for Heating, Heat exchanger and Cooling.

To create a neutral zone, leave a percentage gap between sequences.

The set P-band for the supply air controller is for the whole controller signal. This means that the P-band for each sequence is proportionate to the split percentage values given to sequences.

For example

P-band for the supply air controller is set to 33K. The HCOut is set so that cooling gets 0…30% = 30%, the exchanger gets 32…50% = 18% and the heater gets 54…100% = 46%. The individual P-bands will then be:

Chiller: 30% of 33°C = 10°C

Exchanger: 18% of 33°C = 6°C

Heating: 46% of 33°C = 15°C

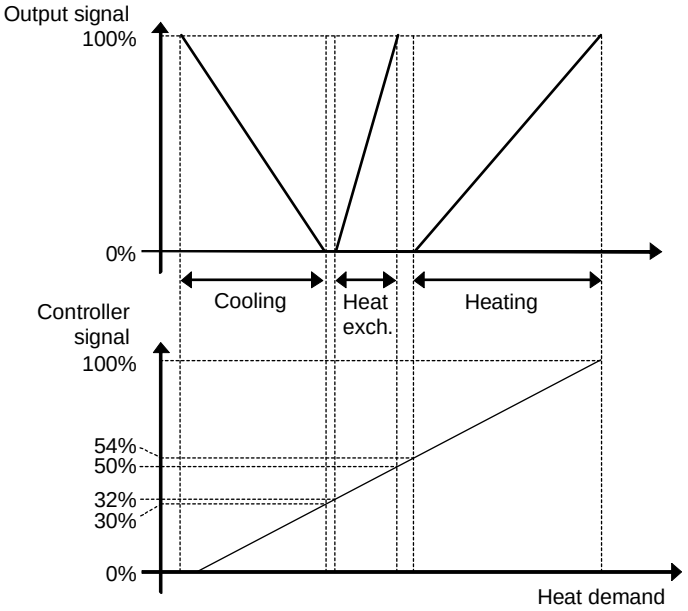
The remaining 2°C are the neutral zone between cooling and exchanger.

```
Split settings
Exchanger
  0% at HCOut= 32%
100% at HCOut= 50%
```

```
Split settings
Heating
  0% at HCOut= 54%
100% at HCOut= 100%
```

```
Split settings
Cooling
  0% at HCOut= 30%
100% at HCOut= 0%
```

```
Split settings
Extra Sequence
  0% at HCOut= 0%
100% at HCOut= 0%
```



16.27.7 Outdoor temp. for control mode change

If the unit is configured for combined Supply air/Room control this menu permits the setting of the change-over outdoor temperature.

```
Outdoor temp for
control mode change
13.0°C
```

16.27.8 Split of optional temp. sequence

Any one of the analogue temperature control output sequences Y1, Y2 and Y3 can be split, for example to control two heating valves in sequence. The split is always even 50/50 which means that each part of the split will have half the part of the P-band assigned to the output. An analogue output must be assigned to the output signal “Split”. On increasing output demand, the regular output is always run first and then the output that has been configured as Split.

```
Split optional
temperature sequence
Y1 Y2 Y3
No split
```

16.27.9 Fast stop on overheating

If this function is active, the fans will be immediately stopped when there is an overheating alarm, regardless of the set cool-down time.

```
Fast stop on alarm
“Electric heating is
overheated”: No
```

16.28 System

16.28.1 Change language

Use this menu to change the display language.

```
Choose language
English
```

Note, this menu is also directly accessible by holding the OK-button depressed during power-up or by pressing right arrow three times when the start display is shown.

The different language files are stored in the application memory and are downloaded to the work memory. If a Corrigo via E tool has been reloaded with a newer program revision than the factory revision, the controller will not allow language files to be downloaded from the application memory. This is because there is a risk that the language files are not compatible with the new revision. Therefore, you are limited to the two languages you have downloaded using E tool.

16.28.2 Choose start display, the text normally shown on the display

There are 5 different to choose from.

Type 1

The text on the first line can be changed using Corrigo E tool.

The second line shows date and time.

The third line shows the present running status.

The fourth line shows the present temperature setpoint and actual values.

```
Vent unit 18 PX
2004-08-15 11:28
System: Running
Sp:22.0°C Act:21.8°C
```

Type 2

The first line shows date and time.

The second line shows the present running status.

The third line shows the present temperature setpoint and actual values.

The fourth line shows present temperature control output values.

```
2004-08-15 11:28
System: Running
Sp:22.0°C Act:21.8°C
Y1:0%  Y2:93% Y3:0%
```

Type 3

The first line shows date and time.

The second line shows the present running status.

The third line shows the present temperature setpoint and actual values.

The fourth line shows present SAF and EAF pressures.

```
2004-03-15 11:28
System: Running
Sp:22.0°C Act:21.8°C
SAF:1100Pa EAF:1050Pa
```

Type 4

The text on the first line can be changed using Corrigo E tool.

The second line shows date and time.

The third line shows the present running status.

```
Vent unit 18 PX
2004-03-15 11:28
System: Running
```

Type 5

The text on the first line can be changed using Corrigo E tool.

The second line shows date and time.

```
Vent unit 18 PX
2004-03-15 11:28
```

16.28.3 Automatic summer/winter time changeover

When Corrigo is set on automatic summer/winter time changeover, the timer will automatically change between summer and winter time according to European standard.

```
Automatic summer/
winter time change
over
Yes
```

16.28.4 Address

Corrigo E uses the addresses below when connecting to Corrigo E tool, and when multiple controllers are connected in an EXO network. E tool normally uses the addresses below, so if an address is changed, the new address must also be entered in E tool. If several Corrigo are connected in a network, all the units must have the same ELA address, but each unit must have a unique PLA address.

```
Address
PLA: 254
ELA: 254
```

16.28.5 Display anywhere (Remote control)

If multiple Corrigo units are connected in a network, it is possible to remote control a unit in the network from a unit with display. You do this by entering the address of the unit you wish to remote control in the unit with display. The function is aborted by pressing the buttons UP, OK and DOWN simultaneously.

```
Address for remote
communication
(PLA:ELA) :  00:00
```

16.28.6 Automatic logoff

If the access level is Operator, Service or System, the user will automatically be logged off to Normal after a settable time of inactivity. The time is settable in units of 5 seconds. Standard 60 units = 5 minutes.

The automatic logoff can be removed, see 8.4.

```
Time before user
automatically
logged off:60
(Unit 5 sec)
```

16.28.7 Activation of start-up wizard

The start-up wizard is a special program which at the first start-up guides the operator through a number of start-up menus where you set certain operation parameters. For more information, see the section Start-up wizard.

```
Activate wizard
No
```

Chapter 17 **Expansion model**

There are eight different 2-port Corrigo models with 15/28 inputs/outputs, with or without display, and with or without TCP/IP port. For a list of the different models, see page 8 (Corrigo E model overview).

17.1 Port 1

On a 2-port Corrigo, port 1 is used for connection to E tool and possibly a SCADA system. On an Exx2S-WEB model, port 1 is the TCP/IP output.

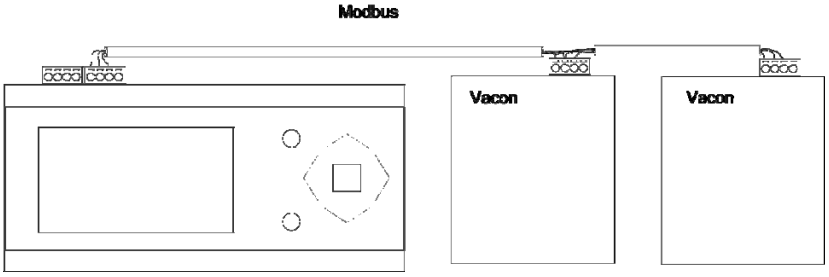
17.2 Port 2

Port 2 is used for expansion units, e.g. expansion controllers and the Vacon NXL frequency converters. As a maximum, either two frequency converters or two expansion controllers can be connected. The controllers must be of the type Corrigo E. There is no point in utilising slave controllers with display since the display cannot be used or show anything. However, an external display is required when starting up slave controllers without display for the first time (if the configuration is done via E tool). All configuration takes place either via E tool or via the display on the master controller. All inputs and outputs can be viewed in the master controller. For configuration of port 2, see section 16.26.2.

17.3 Wiring

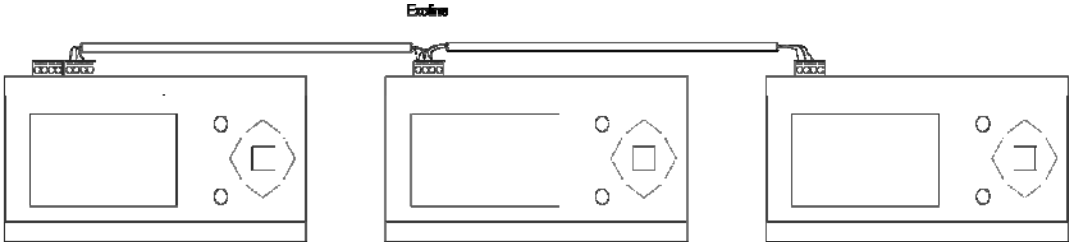
17.3.1 Vacon frequency converters

If the Corrigo is intended to control of one or two of Vacon's NXL frequency converters, Modbus communication via port 2 is utilised.



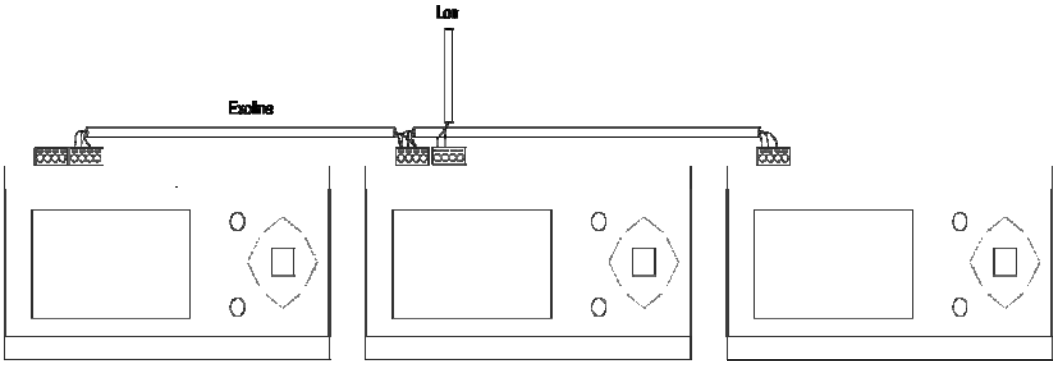
17.3.2 Expansion controllers EXOline

Communication between the master and expansion controllers takes place via EXOline. The slave controllers will be given the addresses 241:1 and 241:2 (ELA:PLA) respectively.



17.3.3 Expansion controllers LON

For a 2-port Corrigo to be able to communicate via LON, the first expansion controller must have a LON port. Communication between the master and expansion controllers takes place via EXOline.



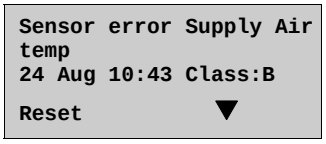
Chapter 18 **Other functions**

18.1 Alarm handling

If an alarm condition occurs, the red Alarm LED on the front panel of units with display or the Alarm LED on a connected display unit will start flashing. The LED will continue to flash as long as there are unacknowledged alarms.

Alarms are logged in the alarm list. The list shows type of alarm, date and time for the alarm and the alarm class (A, B or C alarm).

To access the alarm list, press the alarm button, the front panel button with the red button-top.



If there are multiple alarms, this is indicated by up / down arrow symbols at the right-hand edge of the display.

Use the UP and DOWN buttons to access the other alarms.

At the left end of the bottom display line the alarm status is shown. For active, unacknowledged alarms the space is blank. For alarms that have reset the text: “Reset” is shown, Acknowledged, still active or blocked alarms are indicated by Acknowledged or Blocked.

Alarms are acknowledged by pressing the OK button. You are then given the choice of acknowledging the alarm or blocking the alarm.

Acknowledged alarms will remain on the alarm list until the alarm input signal resets.

Blocked alarms remain on the alarm list until the alarm has reset and the block has been removed. New alarms of the same type will not be activated as long as the block remains.

Since blocking alarms can be potentially hazardous, you need a high user access to block alarms.

Class A and B alarms will activate alarm output(s) if these have been configured.

Class C alarms do not activate the alarm output(s).

Class C alarms are removed from the alarm list when the alarm input resets even if the alarm has not been acknowledged.

18.2 Free text

If RIGHT is pressed once when the start-menu is shown, a menu showing text of your choice is displayed. The text can be used to show information concerning the commissioning company, name and phone number to service personnel etc. The easiest way to enter text is to use E tool, but the buttons can also be used. Up to 4 lines of 20 characters can be entered.

18.3 Revision number

If RIGHT is pressed twice when the start-menu is shown, a menu showing the program revision number and ID number is displayed.

18.4 Language

If RIGHT is pressed three times when the start-menu is shown, a menu is displayed in which the language can be changed.

The different language files are stored in the application memory and are downloaded to the work memory. If a Corrigo via E tool has been reloaded with a newer program revision than the factory revision, the controller will not allow language files to be downloaded from the application memory. This is because there is a risk that the language files are not compatible with the new revision. Therefore, you are limited to the two languages you have downloaded using E tool.

18.5 Indication LEDs

Status indication can be found in the upper left corner of the controller. For controllers with display, the alarm indication and change mode LEDs are located in the keypad area.

Status indication

Designation	Colour	Description
Tx	Green	Port 1, Transmitting
Rx	Green	Port 1, Receiving
Serv (-LON models)	Yellow	Service LED LON, commissioning
LAN (-WEB models)	Yellow/Green	Green: Connected to other network equipment Blinking green: Network traffic Blinking yellow: For identifying
P/B (Power/Battery)	Green/Red	Power on/Battery error
Controllers with built-in display:		
🔔	Red	Alarm indication
✎	Yellow	Change mode

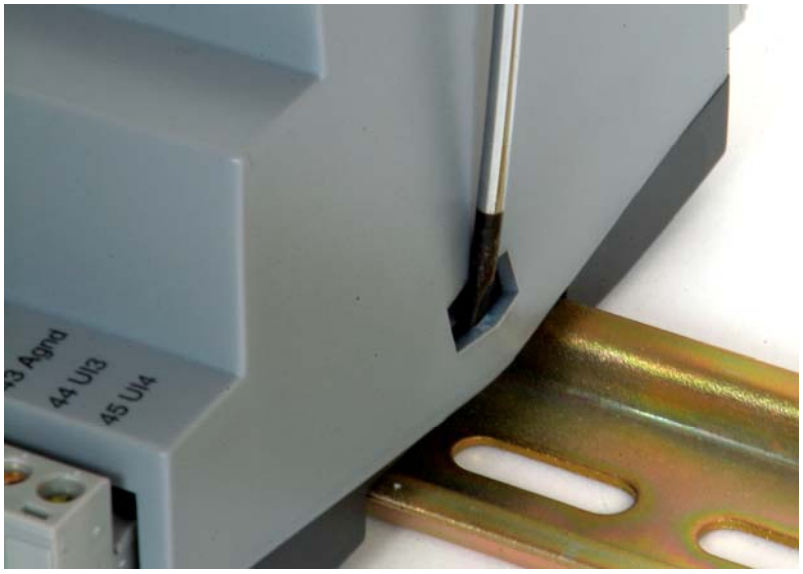
18.6 Changing the battery

This procedure requires knowledge of proper ESD protection; i.e. an earthed wristband must be used!

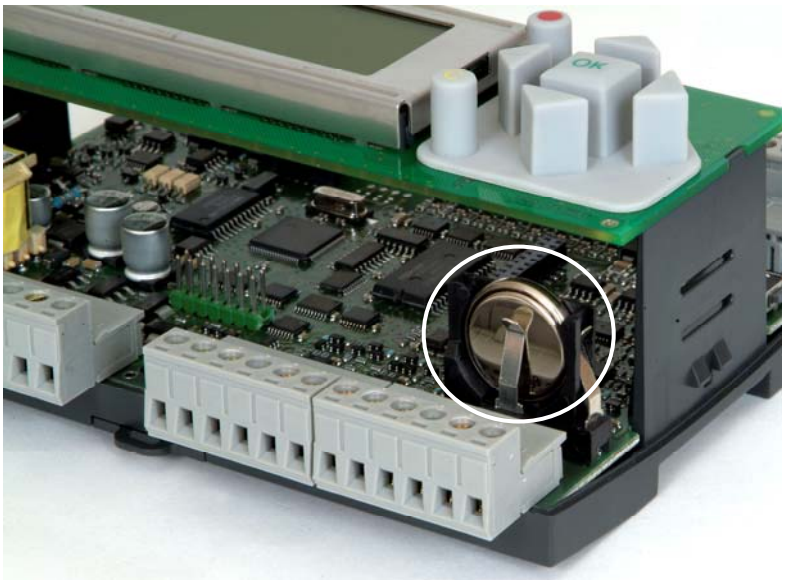
When the alarm ”Internal Battery” is activated and the battery LED lights up red, the battery for backup of program memory and real-time clock has become too weak. The battery is replaced as described below. A backup capacitor saves the memory and keeps the clock running for at least 10 minutes after the power supply is removed. Therefore, if the battery replacement takes less than 10 minutes, there will be no need to reload the program, and the clock will continue to run normally.

The replacement battery must be of the type CR2032.

Remove the cover by pressing down the locking torques at the edge of the cover using a small screwdriver, and at the same time pulling the edges outwards.



Battery location



Grip the battery firmly with your fingers and lift it upwards until it rises from its holder.

Press the new battery firmly down into place. Note that to preserve correct polarity, the battery can only be inserted the “right way round”.

18.7 Start-up wizard

The start-up wizard is a function that can be activated in Configuration/System. See the section Activation of start-up wizard.

If the wizard has been activated, the operator will access a number of menus at power-up. These menus contain certain operation parameters that should be set.

The wizard is useful when the controller is delivered pre-configured together with an air handling unit. After the controller has been configured, the manufacturer of the air handling unit will activate the start-up wizard, which will help the operator to set setpoint values, running times etc. without having to log on.

In the first menu, the language is chosen.

```
Choose language
English
```

In the second menu, the setpoint is set. The appearance of the menu depends on which control type has been configured.

```
Supply air temp
Setp.: 18°C
```

In the third menu, time and date are set.

```
   Time: 14:27
   Date: 2008-11-25
Weekday: Tuesday
```

In the fourth menu, the running time for normal speed Monday – Friday is set.

```
Normal speed
Monday -> Friday
Per 1: 07:00 – 16:00
Per 2: 00:00 – 00:00
```

In the fifth menu, the running time for normal speed Saturday, Sunday and Holiday is set.

```
Normal speed
Saturday -> Holiday
Per 1: 00:00 – 00:00
Per 2: 00:00 – 00:00
```

If 2-speed fans or pressure/flow controlled fans have been configured, the corresponding times for reduced speed will be displayed in the sixth and seventh menus.

```
Reduced speed
Monday -> Friday
Per 1: 07:00 – 16:00
Per 2: 00:00 – 00:00
```

```
Reduced speed
Saturday -> Holiday
Per 1: 00:00 – 00:00
Per 2: 00:00 – 00:00
```

In the last menu you turn off the wizard, and the Corrigo will switch to normal running mode. The selected values will be used.

The wizard will not be shown again.

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