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This manual covers all the models in the Corrigo series used with the ventilation application. This revision covers program revisions from 3.3.

More information

More information about Corrigo can be found in:

- **Corrigo ventilation user guide** – A simplified manual
- **Manual E tool** – Manual on how to configure the controllers using the PC software E tool\(^\circ\), available in Swedish, English, German and French.
- **LON-interface variable list** – Variable list for the Corrigo series, available in Swedish and English.
- **Corrigo ventilation variables for EXOline, Modbus and BACnet** – Variable list for EXOline, BACnet and Modbus communication, available in English.
- **Corrigo ventilation Communication Guide** – The most common Modbus and BACnet variables.
- **Editable PDF files for Corrigo**
- **CE - Declaration of conformity, Corrigo**

The information is available for download from Regin’s website, [www.regin.se](http://www.regin.se).
Chapter 2  About Corrigo

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

In each third generation model Corrigo, all applications are loaded in a separate memory area. The models have article number E...-3 (where 3 stands for third generation). A new feature in version 3.3 are models with three communication ports. The 3 port Corrigo models have article number E...3-3 (where the initial “3” stands for 3 ports). For more detailed information, see chapter 16.

The controllers are available with or without a front panel display and buttons. For all third generation units, both with and without display, a separate, cable-connected terminal E3-DSP with display and buttons is available.

All configuration and normal handling can be done using the display and buttons or using the configuration tool E tool©, installed on a PC and connected via the communication cable E-cable.

2.1 News added in version 3.4

- A neutral zone for the supply air setpoint
- Modbus communication with pressure transmitter DPT-Dual-MOD-2500, HK instruments
- BACnet MS/TP
- Modbus slave TCP
- Flow-dependent analogue filter alarm
- Offset for fan control when free cooling
- Air pressure/flow compensation value, changeable
- Humidity control with extra controller
- New sensor for heat exchanger efficiency calculation
- New digital output for cooling with PWM
- New digital outputs for Y4 and Y5 (activate Y4/Y5)
- New digital input for alarm acknowledgement
- 10 new digital inputs for external alarms
- New analogue output for selectable temperature 0…10 V
- New choice for pressure/flow compensation; outdoor temperature dependent
- Possibility to control two fans in parallel via Modbus: Supply air/supply air, extract air/extract air
- Updated ED-TCV; additional readable and writable values
- Added Modbus signals
- Web server settings directly in the display
- Control of one additional motor, in- and output
- Alarm for extra controller when in manual mode
- Modbus communication with “ECblue” frequency converter
- Pressure measuring in in.wg (“inch of water gauge”). One factor (x100) is used in both program and display.
2.2 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 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.

The initial screen details the model of the Corrigo unit, its communication address, communication speed and which software revision is loaded into the unit.

Press down arrow to go to "Application choices".

Use the up and down arrows to move the cursor in the left edge of the display to the function you wish to select. Select “Application” and press the right arrow.

Move the cursor to the desired application. Press the right arrow.

Press "OK" and change “No” into "Yes". Press "OK".

The most recently loaded ventilation application will now be entered into memory. This will take approx. 30 seconds. The application start screen is displayed.

To change languages, press the right arrow 3 times and then choose a language in the same way you selected an application.

2.2.1 Additional menu options

System:

Information on the Corrigo model and serial number.
EXOreal version.

**EXOreal C revision:**
3.2-0-07  
**SVN Build:**
1420

MAC address and IP address.

**MAC address**
00:30:97:00:87:78  
**IP:**
10.0.0.197

Battery status and memory size.

**Backup battery:**
3.13 V  
**Flash total size:**
8192 kB

Memory status and voltage frequency.

**Flash mem. Free:**
1168 kB  
**Mains power freq:**
50Hz

**Communication:**

Communication mode selection.

- **Serial**
- **TCP/IP**

**Serial:**

Enables selecting EXOline address, communication speed, port mode and routing span.

**EXOline address**
- PLA: 254  
- ELA: 30

**Bitrate port #**
1: 9600 bps  
2: 9600 bps

**Mode port #**
1: Slave  
2: Slave

**Routing (pipe)**

<table>
<thead>
<tr>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLN: 0</td>
<td>255</td>
</tr>
<tr>
<td>ELA 0</td>
<td>255</td>
</tr>
</tbody>
</table>
**TCP/IP:**

Permits selection of EXOline address

```markdown
EXOline address
PLA: 254
ELA: 30
```

Enables EXOline address selection and choice of DHCP (Yes/No).

```markdown
DHCP: Yes
Set static IP
Current IP:
10.0.0.197
```

Also enables manual IP address and subnet mask setting before the Corrigo is initiated.

```markdown
IP:
192.168.001.234
Subnet mask:
255.255.255.000
```

Default Gateway and DNS name is also available under this menu.

```markdown
Default gateway:
192.168.001.001
DNS:
192.168.001.001
```

Current subnet mask, gateway and DNS name.

```markdown
Current Subnetmask:
255.255.255.0
Current Gateway:
10.0.0.1
```

Main computer status.

```markdown
Current DNS:
10.0.0.130
MainComputer status
Not configured
```

Main computer IP address.

Permit connection to main computer.

```markdown
MainComputer IP:
Enable connection to
MainComputer: No
```

TCP port routing to serial port 1 or 2.

```markdown
TCP port routing to serial port: 1
```
**Time/Date:**

Permits setting the time and date.

| Time: 11:50 | Date: 2014-06-25 | Weekday: Wednesday |

**Input/Output:**

Enables In-/Output reading and writing.

---

-> Analog Inputs
Digital Inputs
Universal Inputs
Analog Outputs
Digital Outputs

**Analog Inputs**

- AI1: 0.0 0-10 Volts
- AI2: 0.0 0-10 Volts
- AI3: 0.0 0-10 Volts
- AI4: 0.0 0-10 Volts

**Digital Inputs**

- DI1: Off
- DI2: Off
- DI3: Off
- DI4: Off
- DI5: Off
- DI6: Off
- DI7: Off
- DI8: Off

**Universal Inputs**

- UAI1: 0.0 0-10 Volt
- UAI2: 0.0 0-10 Volt
- UAI3: 0.0 0-10 Volt
- UAI4: 0.0 0-10 Volt
- UDI1: Off
- UDI2: Off
- UDI3: Off
- UDI4: Off

**Analogue Outputs**

- AO1: 0.0 V
- AO2: 0.0 V
- AO3: 0.0 V
- AO4: 0.0 V
- AO5: 0.0 V

**Digital Outputs**

- DO1: Off
- DO2: Off
- DO3: Off
- DO4: Off
- DO5: Off
- DO6: Off
- DO7: Off
2.2.2 Ventilation application

The temperature controller is based on a supply air PI-controller for heating control with a pre-programmed set of control modes. A number of different control functions as well as analogue and digital in- and output functions can be bound to this controller. Certain functions are necessary, while others can be considered optional. 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- or 3-port Corrigo with two expansion units).

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 control).
- Extract air control (cascade control).
- Seasonal switching between supply air temperature control and room/extract air temperature control.
- Outdoor compensated room/extract air control. Can also be controlled as cascade control.
- Extra, separate temperature control circuit for after-heaters, etc.
- Extra control sequences Y4 and Y5 (in addition to Y1, Y2 and Y3) for free integration into the controller output.

**With control of:**

- Heat exchanger (liquid connected, plate or rotating) or mixing dampers.
- Heating coil: Water with or without frost protection or electric with high temperature limit switch.
- Cooling: Water or DX cooling in up to 3 steps.
- Circulation pumps heating, cooling, exchanger.

**Fan control**

- 1- or 2-speed supply air 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) or opposite function (pressure controlled extract air fan with slave connected supply air fan, output dependent or flow dependent).

**Humidity control**

It is possible to use either humidification or dehumidification, or to use combined humidification and dehumidification.

**Timer control**

For starting and stopping the unit, annual clock function. Up to 5 timer outputs for control of external functions such as lighting, doorlocks etc.
Demand controlled ventilation
In buildings with strongly varying occupancy the fan speeds or mixing dampers can be controlled by the air quality measured by a CO₂ 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.

Free cooling
When this function has been activated, it 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.

Free heating
If the outdoor temperature is higher than the indoor temperature and there is a heating demand, the recovery damper will not open for recovery but instead open fully for outdoor air. This may occur during low night-time outdoor temperatures, when the room has been cooled considerably and the outside heat is rising faster than indoors. This function is activated at the same time as “Free cooling”.

Enthalpy control
Measures and compares the energy content (enthalpy) of the outdoor air and the extract air (temperature and air humidity). When this function is active, the mixing damper signal will be overridden to recirculation if the enthalpy is higher outdoors than indoors.

Pretreatment
Damper and pump control for preheating or precooling of the outdoor air via an underground intake channel.

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 (optionally) extract air fan and a recirculation damper with or without temperature control. Used as a recovery function or during heating with support control during the night. Recirculation control is available as an analogue or a digital function.

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.

Change-over
In 2-pipe systems where a combination heater/cooler is operating together with a heat pump, Change-over is a function that enables using the same pipe for both heating and cooling, depending on which is currently required. It uses the output Y1 Heating/Y3 Cooling.
# Corrigo hardware overview

|        | E81-3 | E81D-3 | E151-3 | E151W-3 | E151D-3 | E151DW-3 | E15D-S-LON | E152W-3 | E152DW-3 | E281-3 | E281D-3 | E281DW-3 | E282W-3 | E282DW-3 | E28D-S-LON | E283W-3 | E283DW-3 |
|--------|-------|--------|--------|---------|---------|---------|-------------|---------|---------|--------|---------|---------|---------|-------------|---------|---------|
| AI*    | 2     | 2      | 4      | 4       | 4       | 4       | 4           | 4       | 4       | 4      | 4       | 4       | 4       | 4           | 4       | 4       |
| DI*    | 3     | 3      | 4      | 4       | 4       | 4       | 4           | 8       | 8       | 8      | 8       | 8       | 8       | 8           | 8       | 8       |
| UI*    | -     | -      | -      | -       | -       | -       | -           | 4       | 4       | 4      | 4       | 4       | 4       | 4           | 4       | 4       |
| AO*    | 1     | 1      | 3      | 3       | 3       | 3       | 3           | 3       | 5       | 5      | 5       | 5       | 5       | 5           | 5       | 5       |
| DO*    | 2     | 2      | 4      | 4       | 4       | 4       | 4           | 4       | 7       | 7      | 7       | 7       | 7       | 7           | 7       | 7       |
| RS485  | •     | •      | •      | •       | •       | •       | •           | •       | •       | •      | •       | •       | •       | •           | •       | •       |
| BACnet/IP | •   | •      | •      | •       | •       | •       | •           | •       | •       | •      | •       | •       | •       | •           | •       | •       |
| LON    | •     | •      | •      | •       | •       | •       | •           | •       | •       | •      | •       | •       | •       | •           | •       | •       |
| TCP/IP | •     | •      | •      | •       | •       | •       | •           | •       | •       | •      | •       | •       | •       | •           | •       | •       |
| 1 port | •     | •      | •      | •       | •       | •       | •           | •       | •       | •      | •       | •       | •       | •           | •       | •       |
| 2 ports| •     | •      | •      | •       | •       | •       | •           | •       | •       | •      | •       | •       | •       | •           | •       | •       |
| 3 ports| •     | •      | •      | •       | •       | •       | •           | •       | •       | •      | •       | •       | •       | •           | •       | •       |
| Display| •     | •      | •      | •       | •       | •       | •           | •       | •       | •      | •       | •       | •       | •           | •       | •       |

* AI=analogue inputs, DI=digital inputs, AO=analogue outputs, DO=digital outputs, UI=universal inputs (can be configured to function as either analogue input or digital input).

All third generation Corrigo controllers support external displays.

# Corrigo model overview

<table>
<thead>
<tr>
<th>Models with display</th>
<th>Models without display</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>E81D-3</td>
<td>E81-3</td>
<td>Standard controller with RS485 port</td>
</tr>
<tr>
<td>E151D-3</td>
<td>E151-3</td>
<td>Controller with both LON and RS485 port</td>
</tr>
<tr>
<td>E281D-3</td>
<td>E281-3</td>
<td>Controller with TCP/IP port and built-in web server</td>
</tr>
<tr>
<td>E15D-S-LON</td>
<td>E151W-3</td>
<td>Controller with one RS485 port, one TCP/IP port and built-in web server</td>
</tr>
<tr>
<td>E152DW-3</td>
<td>E152W-3</td>
<td>Controller with two RS485 ports, one TCP/IP port and built-in web server</td>
</tr>
<tr>
<td>E281DW-3</td>
<td>E281W-3</td>
<td></td>
</tr>
<tr>
<td>E283DW-3</td>
<td>E283W-3</td>
<td></td>
</tr>
</tbody>
</table>
2.3 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 21...36 V DC
Power consumption .......................................................... 5 VA, 3 W (DC), model ...W: 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, via a built-in RS485 contact.
  EXOline TCP/IP.
  Modbus communication via serial RS485 communication or TCP/IP.
  BACnet/IP or BACnet MS/TP via RS485 (a BACnet router is needed).
  LON serial communication.

Suitable model should be selected for appropriate needs.

EMC emission and immunity standard
This product conforms to the requirements of the EMC Directive 2004/108/EC through product standards EN 61000-6-1 and EN 61000-6-3.

RoHS
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.

24V DC output(+C)
Voltage ........................................................................................................... 24 V DC± 2V
Max charge ........................................................................................................... 0.1 A

Options
LON ........................................................................ FT3150, gives a second communication route
…W (TCP/IP-port) .............................................................................. EXOline and Modbus communication
2-port Corrigo models ........................ Two serial ports or one serial port and one TCP/IP port
3 ports Corrigo ............................................................ Two serial ports and one TCP/IP port
External hand terminal, E3-DSP ............................ For use with Corrigo units without display
External room unit .............................................................. ED-RU / ED-RUD / ED-TCV

Position of the terminals on the Corrigo
3.1 Installation

Corrigo 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.

Humidity: Max. 90 % RH, non-condensing.

The picture below shows a wiring example for Corrigo E283W-3.
3.2 Wiring

3.2.1 Supply voltage

24 V AC ±15%, 50…60 Hz or 21…36 V DC

If Corrigo and its connected actuators share the same transformer, it is essential that the same transformer pole is used as reference for all the equipment. The equipment may otherwise not function as intended and may also suffer 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 input 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 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 GDO on terminal 10. GDO 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

The lists below are intended to be used during commissioning to help you keep track of the desired input and output functions.

The left column contains a description of the in-/output signal, the middle column displays the name of the corresponding signal in E tool© and the right column shows the text displayed in the Corrigo controller.

### Analogue input signal

<table>
<thead>
<tr>
<th>✓</th>
<th>Description</th>
<th>E tool©</th>
<th>Display</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inactive input</td>
<td>Not active</td>
<td>Not used</td>
</tr>
<tr>
<td></td>
<td>Outdoor temperature sensor, PT1000 or 0…10V</td>
<td>Outdoor Temp</td>
<td>Outd temp</td>
</tr>
<tr>
<td></td>
<td>Supply air temperature sensor</td>
<td>Supply Air Temp</td>
<td>Supply temp</td>
</tr>
<tr>
<td></td>
<td>Extract air temperature sensor</td>
<td>Extract Air Temp</td>
<td>Extract temp</td>
</tr>
<tr>
<td></td>
<td>Exhaust air temperature sensor</td>
<td>Exhaust Air Temp</td>
<td>Room temp1</td>
</tr>
<tr>
<td></td>
<td>Room temperature sensor 1, PT1000 or 0…10V</td>
<td>Room Temp 1</td>
<td>Room temp2</td>
</tr>
<tr>
<td></td>
<td>Room temperature sensor 2</td>
<td>Room Temp 2</td>
<td>Exhaust temp</td>
</tr>
<tr>
<td></td>
<td>CO₂ sensor, 0…10 V DC</td>
<td>CO2 Sensor</td>
<td>Extsensor1</td>
</tr>
<tr>
<td></td>
<td>Pressure transmitter supply air, 0…10 V DC</td>
<td>SAF Pressure</td>
<td>SAF pressure</td>
</tr>
<tr>
<td></td>
<td>Pressure transmitter extract air, 0…10 V DC</td>
<td>EAF Pressure</td>
<td>EAF pressure</td>
</tr>
<tr>
<td></td>
<td>De-icing sensor, heat exchanger</td>
<td>Deicing Temp</td>
<td>Deicing temp</td>
</tr>
<tr>
<td></td>
<td>Frost protection sensor</td>
<td>Frost Protection Temp</td>
<td>Frost prot temp</td>
</tr>
<tr>
<td></td>
<td>Room humidity sensor</td>
<td>Humidity Room</td>
<td>CO2 sensor</td>
</tr>
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<td>Humidity Outdoor</td>
<td>Humidity duct</td>
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<td>External control SAF</td>
<td>SAF ext ctrl</td>
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**Digital input signal**

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<td>Filter alarm 1</td>
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<td>Filter guard, extract air</td>
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<td>Filter alarm 2</td>
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<td>Run-indication/alarm circulation pump, exchanger</td>
<td>Exchange Pump Indication</td>
<td>SAF ind</td>
</tr>
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<td></td>
<td>Run-indication/alarm circulation pump, Cooling</td>
<td>Cooling Pump Indication</td>
<td>EAF ind</td>
</tr>
<tr>
<td></td>
<td>Fire alarm</td>
<td>Fire Alarm</td>
<td>P1 heating</td>
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<td>Fire damper end-switch monitoring</td>
<td>Fire Damper Indication</td>
<td>P1 exchanger</td>
</tr>
<tr>
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<td>Extended operation, Normal</td>
<td>Extended Operation, Normal</td>
<td>P1 cooling</td>
</tr>
<tr>
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<td>Extended operation, Reduced</td>
<td>Extended Operation, Reduced</td>
<td>Filter guard</td>
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<td>Exchange Rotation</td>
<td>Ext run 1/2</td>
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<td>SAF Indication</td>
<td>External alarm</td>
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<td>Run-indication/alarm extract air fan</td>
<td>EAF Indication</td>
<td>External switch</td>
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<td>Deicing thermostat exchanger</td>
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<td>Overheat protection</td>
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<tr>
<td></td>
<td>Start extra motor 1</td>
<td>Motor control 1</td>
<td>Motor1</td>
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<tr>
<td></td>
<td>Start extra motor 2</td>
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<td>Motor2</td>
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<td>Run-indication/alarm extra motor</td>
<td>Motor control 1 indication</td>
<td>Ind motor1</td>
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<td>Run-indication/alarm extra motor</td>
<td>Motor control 2 indication</td>
<td>Ind motor2</td>
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</table>

The universal inputs on Corrigo E28 can be individually 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 output signal

<table>
<thead>
<tr>
<th>✓ Description</th>
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<th>Display</th>
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<td>Y1 actuator heating</td>
<td>Heating Y1</td>
<td>Y1 heating</td>
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<td>Y2 actuator exchanger</td>
<td>Exchanger Y2</td>
<td>Y2 exchanger</td>
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<tr>
<td>Y3 actuator cooling</td>
<td>Cooling Y3</td>
<td>Y3 cooling</td>
</tr>
<tr>
<td>Frequency converter, supply air fan</td>
<td>SAF</td>
<td>SAF</td>
</tr>
<tr>
<td>Frequency converter, extract air fan</td>
<td>EAF</td>
<td>EAF</td>
</tr>
<tr>
<td>Actuator Humidity control</td>
<td>Dehumidification/Humidification</td>
<td>Humidity</td>
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<tr>
<td>Split of any one of temp outputs Y1, Y2, Y3 or Y1 Heating/Y3 Cooling outputs</td>
<td>Split</td>
<td>Split</td>
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<tr>
<td>Extra controller</td>
<td>Extra unit control</td>
<td>Extra unit</td>
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<td>Y1 heating / Y3 cooling, change-over output</td>
<td>Y1 Heating/Y3 Cooling</td>
<td>Y1 heat/Y3 cool</td>
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<td>Y4 extra sequence</td>
<td>Extra Sequence Y4</td>
<td>Y4 extra sequence</td>
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<td>Also used for control of recirculation air damper 0...10V</td>
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<td>Y5 extra sequence</td>
<td>Extra Sequence Y5</td>
<td>Y5 extra sequence</td>
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<td>Temperature output</td>
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<td>Optional temperature 0…10V</td>
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## Digital output signal

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<td>SAF Start 1/1 Normal Speed</td>
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<td>Start/stop Extract air fan Normal</td>
<td>EAF Start 1/1 Normal Speed</td>
<td>EAF 1/1-speed</td>
</tr>
<tr>
<td>Start/stop Supply air fan Reduced</td>
<td>SAF Start 1/2 Reduced Speed</td>
<td>SAF 1/2-speed</td>
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<td>Start/stop Extract air fan Reduced</td>
<td>EAF Start 1/2 Reduced Speed</td>
<td>EAF 1/2-speed</td>
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<td>Start/stop circulation pump, heating</td>
<td>Heating Pump Start</td>
<td>P1 heating</td>
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<td>Fire damper</td>
<td>Fire Damper</td>
<td>P1 exchanger</td>
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<td>Sum alarm A- and B-alarm</td>
<td>Sum Alarm</td>
<td>P1 cooling</td>
</tr>
<tr>
<td>Sum alarm A-alarm</td>
<td>Sum Alarm A</td>
<td>Fire damper</td>
</tr>
<tr>
<td>Sum alarm B-alarm</td>
<td>Sum Alarm B</td>
<td>Sum alarm</td>
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<td>Start/stop circulation pump, cooling</td>
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<td>A-sum alarm</td>
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<td>Start/stop circulation pump, liquid exchanger</td>
<td>Exchanger Start</td>
<td>B-sum alarm</td>
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<td>Exhaust Air Damper</td>
<td>Recirc damper</td>
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<td>Recirculation damper</td>
<td>Recirculation Air Damper</td>
<td>Exhaust air damper</td>
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<td>Exch dec</td>
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<td>Free cool run</td>
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<td>Pulse modulated cooling output</td>
<td>Cooling PWM</td>
<td>Cooling PWM</td>
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<td>Activate Y4</td>
<td>Y4 extra sequence activate</td>
<td>Y4 extra seq</td>
</tr>
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<td>Activate Y5</td>
<td>Y5 extra sequence activate</td>
<td>Y5 extra seq</td>
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<tr>
<td>Start/stop extra motor 1</td>
<td>Motor control 1 start</td>
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</tr>
<tr>
<td>Start/stop extra motor 2</td>
<td>Motor control 2 start</td>
<td>Motor2</td>
</tr>
</tbody>
</table>
General

Before the Corrigo can be used, all inputs and outputs must first be configured, as well as all relevant parameters.

All commissioning can be done using the Corrigo front panel display and buttons or using the external display unit E3-DSP.

E tool©

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

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

A communication cable is required in order to configure Corrigo. E-CABLE2-USB or E-CABLE-RS232 are used for controllers featuring RS485 communication, and an E-CABLE-TCP/IP crossover network cable for controllers with a TCP/IP port.

The Corrigo must be powered up and the application selected in order for it to be configured.

4.1 How to do it

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

For configuration using the front panel or E3-DSP, 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 learning how to use the buttons and menu system, connect power to your Corrigo, log on as Admin and go to the menu "Configuration".
- For the time being, skip the configuration menu In-/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 In-/Outputs.
- Exit the "Configuration" menu 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 individually can 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 menu system.

Access rights
Chapter 8. Learn how to log on to the Corrigo.

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.

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 and troubleshooting your system.

**Other functions**

Chapter 18

Alarm handling etc.
5.1 Temperature control

**General**

Corrigo 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. Cascade connected extract air temperature control
5. Outdoor temperature dependent switching between supply air control with outdoor temperature compensation and room temperature control
6. Outdoor temperature dependent switching between supply air control with outdoor temperature compensation and extract air control
7. Outdoor compensated room temperature control
8. Outdoor compensated extract 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 mode, the temperature at the supply air sensor will be constantly kept at the user setpoint value. In the second mode, the supply air temperature setpoint is adjusted depending on the outdoor temperature.

In modes three and four 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 five and six vary according to the outdoor temperature: Outdoor temperature compensated supply air control, as in mode two, in winter and cascaded room control or cascaded extract air control in summer, as in modes three or four. The switch-over temperature is settable.

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 "Heating Y1", "Exchanger Y2" and "Cooling Y3". 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 two additional analogue output signals for control of optional sequences, Y4 extra sequence and Y5 extra sequence. "Y4 extra sequence" and "Y5 extra sequence" are both set in the same way as above. It is also possible to select whether "Y4 Extra sequence" should be affected by the enthalpy control and/or the cooling recovery.

A change-over signal can also be configured, “Y1 Heating/Y3 Cooling”.

0 % at HCOut = 0% (HCOut= Heating Controller Output)
100 % at HCOut = 0% (HCOut=Heating Controller Output)

"Y4 extra sequence" can also be used for control of a modulating recirculation air damper. In cases where “Y4 extra sequence” controls a water heater battery, frost protection control may be activated.

A change-over signal can also be configured, “Y1 Heating/Y3 Cooling”.

It is also possible to split one of the three analogue outputs Heating, Heat exchanger or Cooling into two equal parts if an additional output function is desired.

Y4 extra sequence, Y5 extra sequence, Humidity control, Extra controller valve and Y1 Heating/Y3 Cooling can also be split.

There is also two pulse-width modulated digital outputs, "Heating PWM" and "Cooling PWM".

Their period times are settable, with a default setting of 60 s.

Example:

With a controller output of 50 % and a period time of 60 s, the output will be on for 30 s and off for 30 s. With a controller output of 25 % the output will be on for 15 s and off for 45 s.
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 "Heating Y1", "Exchanger Y2", "Cooling Y3", "Extra sequence Y4" and “Extra sequence Y5”. A single PI control loop is used.

A neutral zone can be set around the setpoint value.

For example, if the setpoint is 18°C and the neutral zone is 2K, the setpoint for cooling will be 19°C and the setpoint for heating will be 17°C (FI = 0K).

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

Alarms which are activated when the supply air temperature is too high or too low 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 8 node points.

The supply air temperature is kept at the setpoint value by controlling the output signals for "Y1 heating", "Y2 exchanger", "Y3 cooling", "Extra sequence Y4" and “Extra sequence Y5". A single PI control loop is used.

Alarms which are activated when the supply air temperature is too high or too low 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 exchanger", "Y3 cooling", "Extra sequence Y4" and “Extra sequence Y5". 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 exchanger", "Y3 Cooling", "Extra sequence Y4" and “Extra sequence Y5". Two PI loops are used.

The extract air setpoint value is set using the front panel or, alternatively, by 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 (winter), outdoor compensated supply air temperature control will be active, otherwise (summer) cascaded room temperature control as in control mode 4.

7. Outdoor compensated room temperature control

The room temperature can be compensated when the outdoor temperature increases. One can, for instance, imagine accepting a slightly higher room temperature if it is warm outside or, conversely, a slightly lower temperature if it is chilly. This function is included to conserve energy.

8. Outdoor compensated extract air control

The extract air temperature can be compensated when the outdoor temperature increases. One can, for instance, imagine accepting a slightly higher extract air temperature if it is warm outside or, conversely, a slightly lower extract air temperature if it is chilly. This function is included to conserve energy.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Control mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>AI</td>
<td>AI</td>
<td>AI</td>
<td>AI</td>
<td>AI</td>
<td>AI</td>
<td>AI</td>
<td>Supply air sensor</td>
<td></td>
</tr>
<tr>
<td>AI</td>
<td>AI</td>
<td>AI</td>
<td>AI</td>
<td>AI</td>
<td>Outdoor temperature sensor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AI</td>
<td>AI</td>
<td>AI</td>
<td>Extract air sensor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AO</td>
<td>AO</td>
<td>AO</td>
<td>AO</td>
<td>AO</td>
<td>AO</td>
<td>AO</td>
<td>Y1 heating 0…10 V DC **</td>
<td></td>
</tr>
<tr>
<td>AO</td>
<td>AO</td>
<td>AO</td>
<td>AO</td>
<td>AO</td>
<td>AO</td>
<td>AO</td>
<td>Y2 exchanger 0…10 V DC **</td>
<td></td>
</tr>
<tr>
<td>AO</td>
<td>AO</td>
<td>AO</td>
<td>AO</td>
<td>AO</td>
<td>AO</td>
<td>AO</td>
<td>Y3 cooling 0…10 V DC **</td>
<td></td>
</tr>
<tr>
<td>AO</td>
<td>AO</td>
<td>AO</td>
<td>AO</td>
<td>AO</td>
<td>AO</td>
<td>AO</td>
<td>Y4 extra sequence 0…10 V DC</td>
<td></td>
</tr>
<tr>
<td>AO</td>
<td>AO</td>
<td>AO</td>
<td>AO</td>
<td>AO</td>
<td>AO</td>
<td>AO</td>
<td>Extra split Y1, Y2 or Y3 0…10 V DC (optional)</td>
<td></td>
</tr>
<tr>
<td>AO</td>
<td>AO</td>
<td>AO</td>
<td>AO</td>
<td>AO</td>
<td>AO</td>
<td>AO</td>
<td>Y1 Heating/Y3 Cooling Change-over (option)</td>
<td></td>
</tr>
<tr>
<td>DO</td>
<td>DO</td>
<td>DO</td>
<td>DO</td>
<td>DO</td>
<td>DO</td>
<td>DO</td>
<td>Heating 3-pos. increase **</td>
<td></td>
</tr>
<tr>
<td>DO</td>
<td>DO</td>
<td>DO</td>
<td>DO</td>
<td>DO</td>
<td>DO</td>
<td>DO</td>
<td>Heating 3-pos. decrease **</td>
<td></td>
</tr>
<tr>
<td>DO</td>
<td>DO</td>
<td>DO</td>
<td>DO</td>
<td>DO</td>
<td>DO</td>
<td>Exch. 3-pos. increase **</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DO</td>
<td>DO</td>
<td>DO</td>
<td>DO</td>
<td>DO</td>
<td>DO</td>
<td>Exch. 3-pos. decrease **</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DO</td>
<td>DO</td>
<td>DO</td>
<td>DO</td>
<td>DO</td>
<td>DO</td>
<td>Cooling 3-pos. increase **</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DO</td>
<td>DO</td>
<td>DO</td>
<td>DO</td>
<td>DO</td>
<td>DO</td>
<td>Cooling 3-pos. decrease **</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** Choose output type depending on the actuator type: Either AO 0…10 V 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”.

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Frost protection

The heater return water temperature is measured using the analogue input "Frost prot.temp". 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”) will begin to rise as the frost protection temperature falls below “Alarm level” + “Prop. Band” in order to reach 100 % output when the signal has fallen to “Alarm level”.

When “Internal signal” reaches 100 % or the digital input ”Deicing heat exchanger” is activated, the unit is shut down, the heating output is set to completely open mode and an alarm is activated. The unit is restarted when the alarm has been acknowledged and the temperature for the frost protection sensor has risen above “Alarm limit frost” + “P-Band”.

Frost protection control is available on Y1 heating, Y4 extra sequence or on both Y1 and Y4.

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 switch” the unit will be shut down, either according to the stop sequence described in section Start/stop of unit or as an emergency shutdown. The unit will restart after the alarm has been acknowledged and “High temp limit switch” 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.
Contactors drawn inactivated.

Note: 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 the function "fast stop on overheating" is active, the fans will be immediately stopped when there is an overheating alarm, regardless of the set cool-down time.

In- and outputs

<table>
<thead>
<tr>
<th>Water heating</th>
<th>Electric heating</th>
</tr>
</thead>
<tbody>
<tr>
<td>AI</td>
<td>Frost protection sensor (optional)</td>
</tr>
<tr>
<td><strong>DI</strong></td>
<td>Frost protection thermostat water heater (optional)</td>
</tr>
<tr>
<td><strong>DI</strong></td>
<td>High temperature limit switch</td>
</tr>
<tr>
<td><strong>DI</strong></td>
<td>Flow switch (optional)</td>
</tr>
</tbody>
</table>

**Frost protection can also be created using the digital input “Frost protection thermostat water heater” and an external 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 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.
Deicing
De-icing is activated either when the digital input signal "De-icing exchanger" is activated or when the value of the analogue input "Deicing temp" 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. If a differential pressure switch is used in addition to the heat exchanger, the digital input "Deicing thermostat exchanger" is also used.

On de-icing:
A PI-controller compares the de-icing setpoint with the signal "Deicing 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 exchanger. 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.

De-icing
De-icing is activated either when the digital input signal "De-icing exchanger" is activated or when the value of the analogue input "Deicing temp" 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 signal "Exchanger Y2", or the two digital output signals "Exchanger 3-position, increase" and "Exchanger 3-position, decrease", control two dampers for gradual mixing of outdoor air and recirculated air. In this mode the output signal decreases with increasing heat demand.
**Chapter 5**

**Functional description**

**CO₂**

If demand controlled ventilation (see 5.4.2) is activated in combination with mixing dampers, and the CO₂-value rises above the setpoint value, the dampers will let in more outdoor 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®.

CO₂/VOC control can be used on "Y2 exchanger" or "Y4 extra sequence". The control is selectable for use on Y2, Y4 or on both outputs.

**Minimum limit**

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

**In- and outputs**

<table>
<thead>
<tr>
<th>Plate</th>
<th>Rotating Exch.</th>
<th>Liquid</th>
<th>Dampers</th>
</tr>
</thead>
<tbody>
<tr>
<td>AI</td>
<td>AI</td>
<td>AI</td>
<td>AI</td>
</tr>
<tr>
<td>DO</td>
<td>DO</td>
<td>DO</td>
<td>DO</td>
</tr>
<tr>
<td>AI</td>
<td>DO</td>
<td>DO</td>
<td>DO</td>
</tr>
<tr>
<td>DI</td>
<td>AI</td>
<td>AI</td>
<td>AI</td>
</tr>
<tr>
<td>DI</td>
<td>DI</td>
<td>DI</td>
<td>AI</td>
</tr>
</tbody>
</table>

**Start delay exchanger**

This function delays the exchanger start at start-up of the unit.

**100 % exchanger output at start-up**

After the delay described above, the exchanger output will be 100 % during the set time.

**5.1.4 Types of chillers**

**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 percent of the control signal. The number of steps is equal to the number of heater/chiller groups. Minimum on and off times can be set, i.e. the minimum time the step has to be inactive or active for a change to occur.

**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 eight.
Step controllers and Change-over

The digital output signals "Heating/cooling step 1", "Heating/cooling step 2" and "Heating/cooling step 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 supply air controller setpoint is lowered to five degrees (adjustable) 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 supply air controller setpoint is lowered to five degrees (adjustable) 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 (adjustable, 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 supply air 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 supply air controller setpoint is lowered to 11°C (16 – 5) and DX cooling is activated. Should the supply air temperature fall 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 adjustable (+13°C default) and have a fixed one 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 value. 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**

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

<table>
<thead>
<tr>
<th>In- and outputs</th>
<th>Heating</th>
<th>Cooling</th>
<th>Heating/Cooling Change-over</th>
</tr>
</thead>
<tbody>
<tr>
<td>DO</td>
<td>DO</td>
<td>DO</td>
<td>Step controller, step 1 (optional)</td>
</tr>
<tr>
<td>DO</td>
<td>DO</td>
<td>DO</td>
<td>Step controller, step 2 (optional)</td>
</tr>
<tr>
<td>DO</td>
<td>DO</td>
<td>DO</td>
<td>Step controller, step 3 (optional)</td>
</tr>
<tr>
<td>DO</td>
<td></td>
<td></td>
<td>Step controller, step 4 (optional)</td>
</tr>
</tbody>
</table>

**Override of reduced speed for DX cooling**

Override to normal quantity of air for DX cooling when the unit runs on reduced quantity of air. The fans can be set to normal operation when cooling is required at high outdoor temperatures (e.g. >14°C, the same temperature limit as for blocking of DX cooling).

**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 supply air temperature control is used, if a room sensor is installed. 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, temporarily configure room control, change the min. and max. values and then change back to support air control.

Support control can also be configured to start only with the supply air fan. In this mode, the extract air fan is not active. This requires a digital output to be configured, which controls the recirculation damper to open completely so 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 (or an inlet temperature 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 four 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 switch" 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 is selected, the unit will not start free cooling as long as all the temperatures are not within the start and stop temperature intervals.

After three 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).
- The timer outputs for "normal speed", "Extended running, Normal" or "External switch" are On.
- It is past 07:00:00 in the day.

If any stop condition is fulfilled after three 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. It is also possible to set a delay on the fan setpoint when cooling. The digital output "Free cooling operation" is active. The outputs "Y1 heating", "Y2 heat exchanger" and "Y3 cooling" are shut down. After free cooling has been active, the heating output is blocked for 60 minutes (configurable time).
In- and outputs

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AI</td>
<td>Outdoor temperature sensor or Intake temperature</td>
</tr>
<tr>
<td>AI</td>
<td>Room sensor or Extract air sensor</td>
</tr>
<tr>
<td>DO</td>
<td>Free cooling operation</td>
</tr>
</tbody>
</table>

### 5.1.7 Cooling recovery

If the cooling recovery has been configured, there is a cooling requirement and 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. The function also activates the heating function “Free heating”: if heating is required and the outdoor temperature is higher than the extract air temperature, outdoor air will primarily be used.

![Output signals diagram](image)

### 5.1.8 Enthalpy control

Calculating the enthalpy means to calculate the energy content of the air, taking into consideration both the temperature and the air humidity. The value is given in energy per kilogram air (kJ/kg). If enthalpy control is configured, the enthalpy is 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 for cooling the room instead. For the enthalpy calculation to be made, four sensors are required:

In- and outputs

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AI</td>
<td>Outdoor temperature sensor</td>
</tr>
<tr>
<td>AI</td>
<td>Extract air sensor</td>
</tr>
<tr>
<td>AI</td>
<td>Outdoor humidity sensor</td>
</tr>
<tr>
<td>AI</td>
<td>Room/Extract air temperature sensor</td>
</tr>
<tr>
<td>AI</td>
<td>Room humidity sensor</td>
</tr>
</tbody>
</table>
5.1.9 Heat exchanger efficiency monitoring

**General**

The function calculates the heat exchanger temperature efficiency in percent 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:

<table>
<thead>
<tr>
<th>Option 1</th>
<th>Efficiency = ( \frac{(\text{Extractairtemp} - \text{Exhaustairtemp})}{(\text{Extractairtemp} - \text{Outdoortemp})} \times 100 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option 2</td>
<td>Efficiency = ( \frac{(\text{Efficiencytemp} - \text{Outdoortemp})}{(\text{Extractairtemp} - \text{Outdoortemp})} \times 100 )</td>
</tr>
</tbody>
</table>

**Alarm**

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

### In- and outputs

<table>
<thead>
<tr>
<th>Al</th>
<th>Outdoor temperature sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al</td>
<td>Extract air sensor</td>
</tr>
<tr>
<td>Al</td>
<td>Exhaust air sensor</td>
</tr>
<tr>
<td>Al</td>
<td>Efficiency temperature sensor</td>
</tr>
</tbody>
</table>

The efficiency temperature sensor should be located after the heat exchanger but before the heater and replaces the exhaust air temperature sensor.

5.1.10 External setpoint

An external setpoint device, e.g. 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 temperature sensor 1”. 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.

### In- and outputs

| Al | Extra temperature sensor 1 |

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 (but can also be set to run) 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.

Either a digital output (Recirculation damper) or an analogue output (Y4 Extra sequence) can be used as an output signal. When Y4 Extra sequence is used, the damper will become modulating.

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.
The recirculation setpoint can be configured as constant or offset. Constant means that the recirculation setpoint will be used. Offset is based on an offset from the supply air setpoint.

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 gives heating control and closed contact gives 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". For heating control, the digital outputs "Heating Activate" and "Heat Step 1-4" are active. For cooling control "Cooling Activate" and "Cool 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, "Heat/Cool Step 1", "Heat/Cool Step 2" and "Heat/Cool 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.

The change-over function can be split if needed. If so, set the analogue output to “Split” and select the function Y1 Heating/Y3 Cooling.

A digital function called “Split Sequence” is connected to the split signal. It is active when the corresponding analogue signal exceeds 0.1 V.

5.1.13 Extra temperature sensor

The input signals "Extra Sensor Temp 1", "Extra Sensor Temp 2", "...", "Extra Sensor Temp 5", can be used to add extra temperature sensors for supervision of temperatures that are not related to any control functions. Each sensor has three alarms tied to it: High temperature, Low temperature and Sensor error. “Extra temperature sensor 1” should be used for external setpoint input. “Extra Sensor Temp 1” should be used for external setpoint input.

5.1.14 Extra flow sensors supply air and extract air

The input signals "Extra SAF Pressure” and "Extra EAF Pressure” can be used to display the flow in the supply air and extract air ducts. The K- and X-constants for each fan are used to calculate the flow.

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…10 V. 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.
The extra controller can also be used for humidity control. The cooling battery will be used for dehumidification if the room/extract air humidity is too high. The function uses the sensor “Extra unit temp” and is placed immediately after the cooling battery. The function also requires use of a room humidity or extract air humidity sensor.

**Example:** If the room humidity exceeds the setpoint for the function, the cooling battery will be controlled by the external controller. The heater is controlled normally. When the room humidity falls below the setpoint once more, the cooling control will return to normal control. A hysteresis of 1 % is added to the function.

The humidity control functions can be used for the functions "Cascaded room temperature control", "Cascade connected extract air temperature control", "Outdoor compensated room temperature control" as well as "Outdoor compensated extract air control”.

---

**An alarm will be triggered if ”Extra controller” is in manual position or if a sensor error occurs.**

### 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…10 V DC 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.

Maximum limitation function using duct humidity sensor:

If the maximum limitation is 80 % RH and the hysteresis is 20 % RH, the controller output signal will begin decreasing at 60 % RH. When halfway to 80 % RH (i.e. when at 70 % RH), half the output signal will be damped. If the humidity in the duct still reaches 80 % RH, the entire output signal will be damped.

#### 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 humidifiers/dehumidifiers. 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.

If a start signal is needed for a cooling unit or a magnetic valve for DX dehumidification, the digital output signal “Start P1-Cooling” should be used. In this case, the “pump” stop delay should be set to 0 s.

Inputs and outputs

<table>
<thead>
<tr>
<th>AI</th>
<th>Room humidity sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>AI</td>
<td>Duct humidity sensor</td>
</tr>
<tr>
<td>AO</td>
<td>Humidity control output 0…10 V DC</td>
</tr>
<tr>
<td>DO</td>
<td>Dehumidification/Humidification</td>
</tr>
</tbody>
</table>

5.4 Fan control

General

Fans can be 1-speed, 2-speed or variable speed via a frequency converter.

1-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.

Compensation curve

When running pressure control/flow control, it is also possible to temperature compensate the pressure/flow.

The compensation can be dependent on the Supply air, Extract air, Room or Outdoor temperature.

Crosswise interlock

Crosswise interlock of fans can be configured, which e.g. means that if one fan stops, the other fan will also stop.

Timer outputs, interlock at low outdoor temperatures

The fans are normally controlled by the timer channels for normal and reduced speed. At very low outdoor temperatures, "2-speed fans” or "pressure controlled fans” can be forced to "reduced speed”.

The limit temperature is settable and the function has a differential of 2K.

Normal and 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 speed" to "Normal speed", "Reduced speed" is first disengaged. About 2 sec later, "Normal speed" is activated.

When Corrigo switches from "Normal speed" to "Reduced speed", there is a settable retardation time from disengagement to activation. 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

During pressure control, two separate analogue output signals are used for supply and extract air and two separate analogue input signals for supply and extract air for pressure transmitters. The fan speeds are controlled via frequency converters, thereby maintaining constant pressure. The pressure transmitter inputs are scalable using “Min volt input (Vmin)” and “Max volt input (Vmax)”.

A digital activation signal is normally used for each fan ("SAF Freq Start " and " EAF Freq Start "), 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 Operation, Normal" and "Extended Operation, 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.

The compensation can be selected to apply to both normal and reduced speed, or for normal speed only (factory setting = both speeds).

Extra compensation curve

As a complement to the above outdoor compensation, there is a function called "Extra compensation curve pressure/flow setpoint" which can be used to set a compensation based on the room, extract air, supply air or outdoor temperature. The curve has three parameter pairs which correspond to the value of the compensation at three different temperatures.

Controller output-dependent extra compensation curve

The compensation is made using the control curve, one for heating demand and one for cooling demand. It is possible to select whether the compensation (0...10000) should increase or decrease the pressure setpoint. The 0...10000 compensation follows the current control quantity for the fans.
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.

$$\text{Flow} = K \times \Delta P^x$$

Where $K$ and $x$ are settable constants dependent on the fan size and $\Delta P$ 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.

Using E tool\textsuperscript{e}, 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.

The compensation can be selected to apply to both normal and reduced speed, or for normal speed only (factory setting = both speeds).

Extra compensation curve

As a complement to the above outdoor compensation, there is a function called "Extra compensation curve" which can be used to set a compensation based on the room, extract air, supply air or outdoor temperature. The curve has three parameter pairs which correspond to the value of the compensation at three different temperatures.

Controller output-dependent extra compensation curve

The compensation is made using the control curve, one for heating demand and one for cooling demand. It is possible to select whether the compensation (0...10000) should increase or decrease the pressure setpoint. The 0...10000 compensation follows the current control quantity for the fans, in this case pressure.
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 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 e.g. a VAV unit. The signal controls the fans 0…100% (0…10 V 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.) The extract air fan will start directly at 50% after the start delay. Then the heating of the exchanger will work for this operating mode as well. When the supply air fan starts, the extract air fan will be slave controlled by the supply air flow.

Frequency control EAF with SAF slave

The rotational speed of the extract air fan is controlled by a pressure transmitter which is placed in the extract air duct. The supply air fan has no pressure transmitter. Instead, the supply air fan output is made to follow the extract air fan control signal. A scaling factor can be added if the supply air fan characteristics are not the same as the characteristics of the extract air fan (only pressure control of the extract 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 present 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 supply air flow is the setpoint used for control of the extract air fan. A scaling factor can be added if the extract air fan does not have the same characteristics as the supply air fan.
Frequency control EAF with flow control SAF

The rotational speed of the extract air fan is controlled by a pressure transmitter which is placed in the extract air duct. The supply air fan is controlled by the extract air duct flow in order to achieve a balanced ventilation. A pressure transmitter placed in the extract air fan cone (“Extra SAF Pressure”) provides a measurement of the current extract air flow. A corresponding pressure transmitter is placed in the supply air fan cone, providing a measurement of the supply air flow.

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

Frequency control SAF and EAF with external flow setpoint

This signal can be used to control the SAF and EAF flow setpoints from an external VAV system if the ”Frequency control external” fan type is used.

If this signal is configured as an analogue input signal, the flow setpoint for the SAF and EAF will be controlled in normal speed.

The signal can be configured by using scaling: Min volt input (Vmin)/Min flow and Max volt input (Vmax)/Max flow.

Minimum limit

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

| In- and outputs |
|-----------------|-----------------|-----------------|
| 1-speed | 2-speed | Pressure/Flow |
| DO | DO | Start SAF Normal |
| DO | DO | Start EAF Normal |
| DO | DO | Start SAF reduced |
| DO | DO | Start EAF reduced |
| DO | DO | SAF frequency start |
| DO | 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 |
| AI | | Extra pressure transmitter SAF |
| AI | | Extra EAF Pressure |
| AI | | External flow setpoint |
| 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 CO₂ 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 CO₂ value rises above control value one the fans will start at reduced speed, if they are not already running. Should the CO₂ value continue to rise the fan speed will also increase until the CO₂ value reaches control value two at which point the fans will be running at normal speed. The fans will stop when the CO₂ value falls 160 ppm below control value one.

If demand controlled ventilation is activated in combination with mixing dampers, and the CO₂-value rises above the setpoint value, the dampers will let in more outdoor 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.

**In- and outputs**

| AI   | CO₂ sensors |

### 5.4.3 Extra control for external motor

External control of an external (fan) motor can be configured. The fan is started either via a digital input or via a time channel.

A digital output activates the (fan) motor. A digital input is available for run time indication/motor protection.

**Inputs and outputs**

<table>
<thead>
<tr>
<th>DI</th>
<th>Motor control 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>DI</td>
<td>Motor control 1 indication</td>
</tr>
<tr>
<td>DI</td>
<td>Motor control 2</td>
</tr>
<tr>
<td>DI</td>
<td>Motor control 2 indication</td>
</tr>
<tr>
<td>DO</td>
<td>Motor control 1 start</td>
</tr>
<tr>
<td>DO</td>
<td>Motor control 2 start</td>
</tr>
</tbody>
</table>

### 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 (FS +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 stop delay.

The pump will be exercised once daily at 3 p.m. for one 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 stop delay, 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 stop delay, whichever is the longest.
Corrigo can be configured to block DX cooling if a "Malfunction P1-Cooling" alarm should occur.

<table>
<thead>
<tr>
<th>Heating</th>
<th>Exch.</th>
<th>Cooling</th>
</tr>
</thead>
<tbody>
<tr>
<td>AI</td>
<td></td>
<td>Outdoor temperature sensor</td>
</tr>
<tr>
<td>DO</td>
<td>DO</td>
<td>Start/stop circulation pump</td>
</tr>
<tr>
<td>DI</td>
<td>DI</td>
<td>Run ind/alarm, circ. pump</td>
</tr>
</tbody>
</table>

5.6 Damper control

5.6.1 Close-off dampers

The outdoor 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, they can be configured to be normally open instead via the display.

See chapter 16.15 for more information on the function.

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 "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, "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.

In- and outputs

<table>
<thead>
<tr>
<th>DO</th>
<th>Outdoor air damper</th>
</tr>
</thead>
<tbody>
<tr>
<td>DO</td>
<td>Exhaust air damper</td>
</tr>
<tr>
<td>DO</td>
<td>Fire damper</td>
</tr>
<tr>
<td>DI</td>
<td>Fire alarm</td>
</tr>
<tr>
<td>DI</td>
<td>Fire damper end switch monitoring</td>
</tr>
</tbody>
</table>

5.7 Extended running and External switch

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. "Extended Operation, 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 "Extended Operation, Normal” or "Extended Operation, Reduced” says it should stay in running mode.

In- and outputs

<table>
<thead>
<tr>
<th>DI</th>
<th>Extended Operation, Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>DI</td>
<td>Extended Operation, Reduced</td>
</tr>
<tr>
<td>DI</td>
<td>External switch</td>
</tr>
</tbody>
</table>

5.8 Time-switch outputs

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

Timer output five can be used to control the function Recirculation. See 5.1.11.

In- and outputs

<table>
<thead>
<tr>
<th>DO</th>
<th>Extra time channel 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>DO</td>
<td>Extra time channel 2</td>
</tr>
<tr>
<td>DO</td>
<td>Extra time channel 3</td>
</tr>
<tr>
<td>DO</td>
<td>Extra time channel 4</td>
</tr>
<tr>
<td>DO</td>
<td>Extra time channel 5</td>
</tr>
</tbody>
</table>

5.9 Alarms

Alarm handling

Alarms are indicated by the red alarm LED on the front or on E3-DSP.

All alarms can be monitored, acknowledged and blocked using the display and buttons or via E3-DSP. There is also a digital input to acknowledge all alarms.
**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/C-alarms or both A- and B/C alarms. The digital outputs can be inverted, so that an inoperative alarm gives a high output and vice versa. 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\(^\text{©}\). For more information, see the E tool\(^\text{©}\) manual.

<table>
<thead>
<tr>
<th>In- and outputs</th>
<th>Sum alarm A + B + C</th>
</tr>
</thead>
<tbody>
<tr>
<td>DO</td>
<td>Sum alarm A</td>
</tr>
<tr>
<td></td>
<td>Sum alarm B/C</td>
</tr>
</tbody>
</table>

**External alarms**

There are 11 possible external alarms: One digital input entitled "External Alarm" and 10 digital inputs called "Extra alarm".
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
2. The unit is started manually using the Corrigo front panel or via E3-DSP
3. Digital input for extended running is activated
4. Support control is activated and the present 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.

Possibility to block automatic restart at power-up

The function "Automatic restart at power-up" makes it possible to block automatic restart of the unit at power-up. At power-up, the B-alarm "Restart blocked after power on" is generated. Once this alarm has been acknowledged, the unit will start.

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 switch.
6. The unit is stopped manually using the Corrigo front panel or E3-DSP.
7. Support control is activated and the present room temperature is higher/lower than the preset 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 +3°C 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 +15°C the heat exchanger will be run at 100% capacity for a pre-set time.

3. Signals for outdoor air and exhaust air dampers are activated.

4. The extract air fan or the pressure control of the extract air fan will be started after a preset time.

5. The supply air fan or the control of the supply 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. Outdoor air and exhaust air dampers are shut down.

5. Actuator signals are set to zero and the pumps are stopped.

6. If shutdown mode is configured, it will be activated.

In order to maintain an acceptable supply air temperature as long as possible, the heat exchanger will continue to run during the stop sequence until everything else is stopped.
Chapter 7 Display, LEDs and buttons

This section is applicable to Corrigo units with display and buttons but also to the hand terminal E3-DSP which can be connected to Corrigo units without display and buttons.

Room units are available with or without display, or as a touch display (see instructions and product sheets for ED-RU..., ED-RU-D... and ED-TCV).

7.1 Display

The display has four rows of 20 characters and is backlit. The illumination is normally dimmed, but is activated as soon as a button is pressed. The illumination will be dimmed 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: four arrow buttons which will be called UP, DOWN, RIGHT and LEFT. The menus in the Corrigo 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

The choice of access level/user access determines which menus are shown in the menu system.

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

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

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

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

With Admin access, 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. At each level there may be several new menus through which you may move using the UP and 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 with flashing.

A quick blinking (2 times/s) indicates that the parameter can be changed using the present user access.

A slower blinking (1 time/s) 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 eight below. Otherwise, a cursor will appear at the first settable value. If you wish to change the value, do so by pressing the UP and 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 OK.

To abort a change and return to the initial setting, press and hold the C-button until the cursor disappears.
There are four different access levels. The Admin level has the highest access, while the Service, Operator and basic "no-log on" level have the lowest. The choice of access level determines which menus are shown, as well as which parameters can be changed in the displayed menus.

Admin 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 the DOWN button when the start-up display is shown until the arrow-marker to the left of the text-list points to "Access rights". Press RIGHT.

### 8.1 Log on

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 button until the correct digit is displayed. Press the RIGHT button 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 the LEFT button 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.

#### Automatic logoff

If the access level is Operator, Service or Admin, 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:

- Admin 1111
- Service 2222
- Operator 3333
- Normal 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 Admin you can change all passwords, but as Operator you can only change the Operator and Normal passwords. There is no point in changing the Basic password since access to that level is granted automatically to all users.

![Change password for level: Operator New password: ****](image)

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

Forgotten your password? If the password for Admin 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

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

9.1 Running mode, unit

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

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

9.2 Selected functions

Shows the present 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 timer on
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 present 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 and digital outputs are shown here as examples.

**Analogue inputs**

<table>
<thead>
<tr>
<th>AI1: 18.5 Outd temp</th>
</tr>
</thead>
<tbody>
<tr>
<td>AI2: 20.3 Supply temp</td>
</tr>
<tr>
<td>AI3: 28.2 Extract temp</td>
</tr>
<tr>
<td>AI4: 19.9 Room temp1</td>
</tr>
</tbody>
</table>

**Digital outputs**

<table>
<thead>
<tr>
<th>DO1: Off SAF 1/1-speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>DO2: Off EAF 1/1-speed</td>
</tr>
<tr>
<td>DO3: On P1 Heating</td>
</tr>
<tr>
<td>DO4: Off Sum alarm</td>
</tr>
</tbody>
</table>
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 below menus are available, providing the corresponding input has been activated.
Setpoints are available with a separate value for reduced speed. This is achieved using a temperature offset when the unit runs in reduced speed.

The temperature is available in either Celsius (°C) or Fahrenheit (°F).

Setpoint.

Control mode 1: Supply air control.

<table>
<thead>
<tr>
<th>Outd temp: 18.4°C</th>
<th>Supply air temp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Act: 19.8°C</td>
<td>Setp: 20.0°C</td>
</tr>
</tbody>
</table>

Submenu: Setpoint

<table>
<thead>
<tr>
<th>Supply air temp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setp: 20.0°C</td>
</tr>
</tbody>
</table>

Control mode 2: Outdoor compensated supply air control.

Control mode 5: Outdoor temperature dependent supply air or room temperature control.

Control mode 6: Outdoor temperature dependent supply air or extract air control.

Submenu: "Setpoint curve"

In control modes five and six, the setpoint relationship is used when supply air control is active.

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

Both the outdoor and supply air temperatures are changeable for the curve.

<table>
<thead>
<tr>
<th>Outdoor comp setp</th>
</tr>
</thead>
<tbody>
<tr>
<td>-20.0°C = 25.0°C</td>
</tr>
<tr>
<td>-15.0°C = 24.0°C</td>
</tr>
<tr>
<td>-10.0°C = 23.0°C</td>
</tr>
</tbody>
</table>
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.

In control mode five, the setpoint is used when cascade connected 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:

Control mode 4: Cascade connected extract air control.

Control mode 6: Outdoor temperature-dependent supply or extract air control.

In control mode six, the setpoint is used when cascade connected extract air control is active.

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

Control mode 7: Outdoor temperature compensated room control.
In control mode seven, the room setpoint is compensated based on outdoor temperature. Note that the curve must be reset for optimum functionality.

Both the outdoor and room temperature are changeable for the curve.

**Control mode 8: Outdoor temperature compensated extract air control.**

In control mode 8, the extract air setpoint is compensated based on outdoor temperature. Note that the curve must be adjusted for optimal functionality.

Both the outdoor and extract air temperature are changeable for the curve.
Support control heating

<table>
<thead>
<tr>
<th>Support heating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room temp for</td>
</tr>
<tr>
<td>Start: 15.0°C</td>
</tr>
<tr>
<td>Stop: 21.0°C</td>
</tr>
</tbody>
</table>

Support control cooling

<table>
<thead>
<tr>
<th>Support cooling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room temp for</td>
</tr>
<tr>
<td>Start: 30.0°C</td>
</tr>
<tr>
<td>Stop: 28.0°C</td>
</tr>
</tbody>
</table>

Frost protection temperature

<table>
<thead>
<tr>
<th>Frost protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual: 30.9°C</td>
</tr>
</tbody>
</table>

Deicing exchanger

<table>
<thead>
<tr>
<th>Deicing exchanger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual: 11.2°C</td>
</tr>
<tr>
<td>Setp: -3.0°C</td>
</tr>
<tr>
<td>Hysteresis: 1.0°C</td>
</tr>
</tbody>
</table>

Heat exchanger efficiency monitoring

<table>
<thead>
<tr>
<th>Efficiency exch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual: 93%</td>
</tr>
<tr>
<td>Output exchanger</td>
</tr>
<tr>
<td>Actual: 100%</td>
</tr>
</tbody>
</table>

Recirculation (see 5.1.11)

<table>
<thead>
<tr>
<th>Temp.setpoint when recirc. (Supply/Extract/Room)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.0°C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Offset SAF when frequency control and recirculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0 Pa</td>
</tr>
</tbody>
</table>

"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 Pascal (Pa) or in inch of water gauge (in.wg). When in.wg is selected, a factor (x100) is used both in the program and in the displays. If flow control has been configured, it is set in m³/h. If manual control has been configured, the offset is set in percent.

Extra unit (see 5.2)

<table>
<thead>
<tr>
<th>Extra unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual: 21.2°C</td>
</tr>
<tr>
<td>Setp: 20.0°C</td>
</tr>
</tbody>
</table>

Enthalpy control

<table>
<thead>
<tr>
<th>Enthalpy indoors</th>
</tr>
</thead>
<tbody>
<tr>
<td>33.8 kJ/Kg</td>
</tr>
<tr>
<td>Enthalpy outdoors</td>
</tr>
<tr>
<td>35.0 kJ/Kg</td>
</tr>
</tbody>
</table>
Submenus

<table>
<thead>
<tr>
<th>Outd temp</th>
<th>Act: 12.8 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Humidity outdoors</td>
</tr>
<tr>
<td></td>
<td>Act: 98.7 % RH</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indoor temp</th>
<th>Act: 17.2 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Humidity indoors</td>
</tr>
<tr>
<td></td>
<td>Act: 55.7 % RH</td>
</tr>
</tbody>
</table>

Status enthalpy control

<table>
<thead>
<tr>
<th>Override cool</th>
</tr>
</thead>
<tbody>
<tr>
<td>recovery due to</td>
</tr>
<tr>
<td>enthalpy</td>
</tr>
<tr>
<td>Active</td>
</tr>
</tbody>
</table>
Chapter 11 Air control

Pressure control SAF and EAF

Pressure control can be set in pascal (Pa) or in inch water gauge (in.wg). A factor (x100) is used in the program and displays when the unit is set to in.wg.

When using pressure or flow controlled fans, the setpoint can be temperature 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", which means that you need to take caution when using this function so the pressure does not become 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)

Submenu "Setpoint"

Pressure ctrl SAF
Actual: 480 Pa
Setp: 490 Pa

Submenu "Outdoor compensation"

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

Submenu "Extra compensation curve"

Comp sens: Roomtemp1
15 °C = 0 Pa
20 °C = 0 Pa
25 °C = 0 Pa-

Submenu “Controller output compensation if cooling”

Controller output
comp if cooling
0 at HCOUT= 0%
100 at HCOUT= 0%

Submenu “Controller output compensation if heating”

Controller output
comp if heating
0 at HCOUT= 0%
100 at HCOUT= 0%

The compensation follows the current control quantity, in this case pressure.

Submenu “Controller output compensation”
Flow units can be measured in both m³/h (cubic meters per hour) and in CFM (cubic feet per minute).

**Flow control SAF (there are corresponding menus for EAF)**

---

**Submenu "Setpoint"**

---

**Submenu "Outdoor compensation"**

---

**Submenu "Extra compensation curve"**

---

**Submenu “Controller output compensation if cooling”**

---

**Submenu “Controller output compensation if heating”**

---

The compensation follows the current control quantity, in this case pressure.

**Submenu “Controller output compensation”**

---

**Submenu “Compensation only when”**

---
Flow units can be measured in both $\text{m}^3/\text{h}$ (cubic meters per hour) and in CFM (cubic feet per minute).

**Manual frequency control SAF (there are corresponding menus for EAF)**

- **Submenu “Setpoint”**
  - Frequency control manual SAF
    - Output: 75% →
  - Output 1/1: 75%
  - Output 1/2: 50%

- **Submenu “Outdoor compensation”**
  - Outdoor comp. outp.
    - -20 °C = 0 %
    - 10 °C = 0 %
    - Act comp: 0 %→

- **Submenu “Extra compensation curve”**
  - Comp sens: Roomtemp1
    - 15 °C = 0 %
    - 20 °C = 0 %
    - 25 °C = 0 %→

- **Submenu “Controller output compensation if cooling”**
  - Controller output comp if cooling
    - 0 at HCOUT= 0% 
    - 100 at HCOUT= 0%

- **Submenu “Controller output compensation if heating”**
  - Controller output comp if heating
    - 0 at HCOUT= 0% 
    - 100 at HCOUT= 0%

The compensation follows the current control quantity, in this case %. The function should not be used when fan setpoint is set to %, as the fans will then risk stopping in some modes.

- **Submenu “Controller output compensation”**
  - Not active

- **Submenu “Compensation only when”**
  - Compensation only when:
    - 1/1-speed: No
    - defrosting: No

Flow units can be measured in both $\text{m}^3/\text{h}$ (cubic meters per hour) and in CFM (cubic feet per minute).

**CO2**

- CO2
  - Actual: 920 ppm
  - Setp: 850 ppm
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…10 V DC for 0…100 % RH.

<table>
<thead>
<tr>
<th>Humidity sensor room</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humidity room</td>
</tr>
<tr>
<td>Actual: 51.9% RH</td>
</tr>
<tr>
<td>Setp: 50.0% RH</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Humidity sensor duct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humidity duct</td>
</tr>
<tr>
<td>Actual: 72.2% RH</td>
</tr>
<tr>
<td>Max limit: 80.0% RH</td>
</tr>
<tr>
<td>Hyst: 20.0% RH</td>
</tr>
</tbody>
</table>

If the maximum limitation is 80 % RH and the hysteresis is 20 % RH, the controller output signal will begin decreasing at 60 % RH. When halfway to 80 % RH (i.e., when at 70 % RH), half the output signal will be damped. If the humidity in the duct still reaches 80 % RH, the entire output signal will be damped.
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 summertime/wintertime change-over.

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.

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.

13.2 Timer Normal speed

There are eight 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 inactivate a period, set the time to 00:00 – 00:00. If both periods of a day are set to 0:00 – 0:00, the unit will not run at 1/1-speed that day.
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.

<table>
<thead>
<tr>
<th>Normal speed</th>
<th>Monday</th>
<th>Per 1: 07:00 – 16:00</th>
<th>Per 2: 22:00 – 24:00</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Normal speed</th>
<th>Tuesday</th>
<th>Per 1: 00:00 – 09:00</th>
<th>Per 2: 00:00 – 00:00</th>
</tr>
</thead>
</table>

**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 eight 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.

<table>
<thead>
<tr>
<th>Reduced speed</th>
<th>Sunday</th>
<th>Per 1: 10:00 – 16:00</th>
<th>Per 2: 00:00 – 00:00</th>
</tr>
</thead>
</table>

**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 zero the unit will only run as long as the digital input is closed.

<table>
<thead>
<tr>
<th>Extended running</th>
<th>60 min</th>
<th>Time in ext Running</th>
<th>0 min</th>
</tr>
</thead>
</table>

**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 eight 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.

<table>
<thead>
<tr>
<th>Timer output2</th>
<th>Wednesday</th>
<th>Per 1: 05:30 – 08:00</th>
<th>Per 2: 17:00 – 23:00</th>
</tr>
</thead>
</table>

If the function "Recirculation" has been configured (see 5.1.11), "Timer output 5" can be used to control 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 1…365. The dates are in the format: MM:DD.

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

<table>
<thead>
<tr>
<th>Holidays (mm:dd)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1: 01-01 – 02-01</td>
<td></td>
</tr>
<tr>
<td>2: 09-04 – 12-04</td>
<td></td>
</tr>
<tr>
<td>3: 01-05 – 01-05</td>
<td></td>
</tr>
</tbody>
</table>
**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 "Auto", "Off" or "On".

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 "On" mode the output signal can be set 0…100 %. The outputs "Y1", "Y2", "Y3", "Y4" and "Y5 if in "Auto" mode, will follow the signal according to the set split values.

<table>
<thead>
<tr>
<th>Supply temp contr</th>
<th>Auto</th>
<th>Manual setting</th>
<th>42.0</th>
</tr>
</thead>
</table>

Start signal "SAF" and "EAF"

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

<table>
<thead>
<tr>
<th>Supply air fan</th>
<th>Auto</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Extract air fan</th>
<th>Auto</th>
</tr>
</thead>
</table>

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

| SAF: | Auto | Manual set: | 0.0 |
### Chapter 14

**Manual / Auto**

**Corrigo Ventilation, revision R**

**EAF:** Auto
Manual set: 0.0

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/Dehumidification**
Auto
Manual set: 0%

Circulation pumps: Heating, Exchanger and Cooling

**P1 heating**
Auto

**P1 exchanger**
Auto

**P1 cooling**
Auto

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

**Outdoor air damper**
Auto

**Exhaust air damper**
Auto

Extra control circuit

**Extra ctrl unit**
Auto
Manual set: 0.0
Extra sequence Y4

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

Extra sequence Y5

| Extra sequence Y5 | 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 Admin. Depending on what choices have been made during configuration, some of the alternatives in this menu group may not be shown.

**Settings**

<table>
<thead>
<tr>
<th>Control temp</th>
<th>Control pressure</th>
<th>Control flow</th>
<th>Control humidity</th>
<th>Control CO2</th>
<th>Control extra unit</th>
<th>Alarm settings</th>
</tr>
</thead>
</table>

### 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 33 K. The split 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 and between exchanger and heating.

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

**Room controller**

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

**Extract air controller**

Extract air control  
P-band: 100.0 °C  
I-time: 300.0 s
Shutdown mode

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

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 five 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

Deicing
- P-band: 100 °C
- I-time: 100 s

15.2 Control pressure

Pressure control SAF

Pressure control SAF
- P-band: 500 Pa
- I-time: 60 s
- Min.output: 0 %

Pressure control EAF

Pressure contr EAF
- P-band: 500 Pa
- I-time: 60 s
- Min.output: 0 %

15.3 Control flow

Flow control SAF

Flow control SAF
- P-band: 1000 m³/h
- I-time: 60 s
- Min.output: 0 %
**Flow control EAF**

Flow control EAF  
P-band: 1000 m³/h  
I-time: 60 s  
Min.output: 0 %

---

**15.4 Humidity control**

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

---

**15.5 Control extra unit**

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

---

**15.6 Alarm settings**

Alarm settings  
Alarm limits  
Alarm delays  
Restore alarm  

---

**15.6.1 Alarm limits**

Alarm limits, supply air

Alarm limits, extract air

Alarm limits, room

Alarm limit frost protection

---

**Chapter 15**  
Settings  
Manual Corrigo Ventilation, revision R
### Alarm limit, pressure

<table>
<thead>
<tr>
<th>Control dev SAF</th>
<th>40.0 Pa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control dev EAF</td>
<td>40.0 Pa</td>
</tr>
</tbody>
</table>

### 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

<table>
<thead>
<tr>
<th>Al del supply air</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control dev:</td>
</tr>
<tr>
<td>High temp:</td>
</tr>
<tr>
<td>Low temp:</td>
</tr>
</tbody>
</table>

#### Alarm delay, extract air

<table>
<thead>
<tr>
<th>Al del extract air</th>
</tr>
</thead>
<tbody>
<tr>
<td>High temp:</td>
</tr>
<tr>
<td>Low temp:</td>
</tr>
</tbody>
</table>

#### Alarm delay, room

<table>
<thead>
<tr>
<th>Al. del. room air</th>
</tr>
</thead>
<tbody>
<tr>
<td>High temp:</td>
</tr>
<tr>
<td>Low temp:</td>
</tr>
</tbody>
</table>

#### Alarm delay, frost protection

| Frost prot.: | 0 s |
| Frost risk: | 0 s |

#### 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

<table>
<thead>
<tr>
<th>Low efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 min</td>
</tr>
</tbody>
</table>

Alarm delay, fan malfunction (SAF and EAF)

<table>
<thead>
<tr>
<th>Alarm delay malfunction</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAF: 120 s</td>
</tr>
<tr>
<td>EAF: 120 s</td>
</tr>
</tbody>
</table>

Alarm delay, pump malfunction

<table>
<thead>
<tr>
<th>Alarm delay malfunc</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1 heating: 5 s</td>
</tr>
<tr>
<td>P1 cooling: 5 s</td>
</tr>
<tr>
<td>P1 exchan: 20 s</td>
</tr>
</tbody>
</table>

Alarm delay, misc.

<table>
<thead>
<tr>
<th>Filter guard1: 180 s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filter guard2: 180 s</td>
</tr>
<tr>
<td>Flow switch: 5 s</td>
</tr>
<tr>
<td>Frost prot: 0 s</td>
</tr>
</tbody>
</table>

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

Alarm delay, misc. 2

<table>
<thead>
<tr>
<th>Alarm delay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deicing DI: 0 s</td>
</tr>
<tr>
<td>Fire alarm: 0 s</td>
</tr>
<tr>
<td>Ext alarm: 0 s</td>
</tr>
</tbody>
</table>

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

Alarm delay, misc. 3

<table>
<thead>
<tr>
<th>Alarm delay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elec. heat: 0 s</td>
</tr>
<tr>
<td>Sensor error: 5 s</td>
</tr>
<tr>
<td>Rot sent exch: 20 s</td>
</tr>
</tbody>
</table>

15.6.3 Restore alarm

<table>
<thead>
<tr>
<th>Service alarm</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Filter alarm)</td>
</tr>
<tr>
<td>Time counter set to zero: No</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Save user settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
</tr>
</tbody>
</table>

The present configuration can be saved in a separate memory area and can later be restored using the previous menu, "Restore user settings".
Chapter 16 Expansion model

2 and 3 port Corrigo units are available with or without display. Both models have a TCP/IP port and one or two serial ports. For a list of the various models, see the Corrigo model overview in chapter 2.

16.1 Ports

The ports are used for connecting to E tool© and, possibly, a SCADA system. In an E…3W-3 model, port 3 is the TCP/IP output.

The serial ports (ports 1 and 2) are used for expansion purposes, e.g for connection of expansion units, external display and Vacon NXL/Lenze SMV/Omron/Emerson/LS/EBM/Danfoss FC 101/ECBlue frequency converters. A maximum of two frequency converters and two expansion units can be connected. The units must be Corrigo controllers. There is no point in using slave controllers with a display, since the display cannot be used or show anything. However, an E3-DSP is required when initially starting up slave units without display. All configuration takes place using E tool©, or via the display on the master controller. All inputs and outputs can be viewed in the master controller. For configuration, see chapter 17.

As of version 3.1, frequency converters and expansion units can be used together.

Ports 1 and 2 have the same functions. They can, however, not be configured to have the same function at the same time. The TCP/IP port (port 3) can be used to connect the controller to CLOUDigo or, optionally, to load a web page to the unit. For more information, see the E tool© manual.

16.2 Wiring

16.2.1 Vacon/Lenze/Omron/Emerson/LS/EBM/ECBlue frequency converters

If the Corrigo is intended to control one or two of the Vacon NXL/Lenze SMV/Omron V1000/Emerson/Danfoss FC 101/ECBlue frequency converters, Modbus communication via port two is used.

Two parallel connected frequency converters for supply air and two parallel connected frequency converters for extract air can be run. The supply air fan will have address 1 and the parallel supply air fan address 3. The extract air fan will have address 2 and the parallel extract air fan address 4.

For additional settings for frequency converters, see appendix at the end of this document.
16.2.2 Expansion units EXOline

Communication between the master and expansion units takes place via EXOline. The slave controllers will be given the addresses 241:1 and 241:2 (ELA:PLA) respectively.

16.2.3 Expansion units LON

For a 2 or 3 port Corrigo master to be able to communicate via LON, the first expansion unit must have a LON port. Communication between the master and expansion units takes place via EXOline.
Chapter 17  Configuration

Start by logging on as Admin. 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).

17.1 Inputs and outputs

| Inputs/Outputs | Sensor settings | Control function | Fan control | Extra control unit | Extra sequence Y4 | Extra sequence Y5 | 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 | Actuat. period time | Step controllers | Recirculation | Pretreatment | Alarm settings | Communication | Other parameters | System |

General

Free configuration

Any control signal can be bound to any in- and 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 in- and outputs.

Delivery setting

On delivery, all physical in- and outputs have already been bound to a signal.

The delivery settings are suggestions only and can easily be changed.
### 17.1.1 Analogue inputs AI

**AI1:**
- **Sign:** Outd temp
- **Raw value:** 18.4
- **Compensation:** 0.0 °C

All analogue inputs are for PT1000 or 0…10 V.

Input signals can be compensated e.g. 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 CO₂ control, the following menus will appear:

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

- **CO₂ at**
  - 0 V: 0.0 ppm
  - 10 V: 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. The filter factor can be changed via the display or E tool© and is found after "analogue inputs" in "configuration". A new value is calculated using the following formula:

\[
\text{New value} = \text{old value} \times \text{filter factor} + \text{raw value} \times (1 - \text{filter factor})
\]

### 17.1.2 Digital inputs DI

**DI1**
- **NO/NC:** NO
- **Signal:** Filter guard 1
- **Status:** No

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.

### 17.1.3 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 submenus with settings. These menus are accessed by pressing RIGHT.

### UAII:
- **Sign:** SAF pressure
- **Raw value:** 8.5
- **Compensation:** 0.0 °C

### UDI1:
- **NO/NC:** NO Signal
- **Not used**
- **Status:** No

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.

### 17.1.4 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".

### 17.1.5 Digital outputs

### DOI:
- **Signal:** SAF 1/1-speed
- **Auto**
- **Status:** On

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

### 17.2 Sensor settings

PT1000 setpoint devices can be connected to function as outdoor and room temperature sensors. Alternatively, 0...10 V transmitters can also be used.

If any of the sensors are set to 0...10 V, the sensor can be scaled using the right arrow key on the controller:

### Room temp1
- **Sensor type:** PT1000
- **0V = 0 °C**
- **10V = 100 °C**
17.3 Control function

There are eight different control functions to choose from:

1. Supply air control.
2. Outdoor-temperature compensated supply air control.
3. Cascaded room temperature control
4. Cascade connected 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 Cascade connected extract air temperature control.
7. Outdoor compensated room temperature control
8. Outdoor compensated extract air control

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

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

17.4 Fan control

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".

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

SAF with EAF slave / EAF with SAF slave

If fan slave operation has been configured, there is a submenu for setting the CAV factor, a factor which determines the slave fan output in relation to the output of the controlling fan.
SAF with EAF flow control / EAF with SAF flow control

If fan slave operation and flow control has been configured, there are submenus for setting the flow calculation factors for "SAF" and "EAF", and the CAV factor for "SAF/EAF".

### SAF flow control factors

- **K-constant**: 100
- **X-constant**: 0.50

### EAF flow control factors

- **K-constant**: 100
- **X-constant**: 0.50

### SAF/EAF CAV factor:

1.00

For more detailed description, see the section SAF with EAF flow control / EAF with SAF 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**

17.5 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**
17.6 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".

<table>
<thead>
<tr>
<th>Mode Extra sequence Y4</th>
<th>Not active</th>
</tr>
</thead>
</table>

17.7 Extra sequence Y5

"Extra sequence Y5" can be configured to “Active” or “Not active”.

<table>
<thead>
<tr>
<th>Mode Extra Sequence Y5</th>
<th>Not active</th>
</tr>
</thead>
</table>

17.8 Heating coil

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.

<table>
<thead>
<tr>
<th>Heating Water</th>
</tr>
</thead>
</table>

17.9 Exchanger

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 outdoor air percentage is settable 0…100%.

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

<table>
<thead>
<tr>
<th>Outd temp control of exch: Off</th>
<th>Outd temp start: 10°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diff stop: 0.2°C</td>
<td></td>
</tr>
</tbody>
</table>

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

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

For detailed description of DX-cooling, see 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.

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.

**Blocking of DX cooling on cooling pump alarm**

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

**Override of reduced speed for DX cooling**

Override to normal quantity of air for DX cooling when the unit runs on reduced quantity of air. The fans can be set to normal operation when cooling is required at high outdoor temperatures (e.g. >14°C, the same temperature limit as for blocking of DX cooling).
17.11 Pump control

<table>
<thead>
<tr>
<th>P1 heating</th>
<th>P1 exchanger</th>
<th>P1 cooling</th>
</tr>
</thead>
</table>

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

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.

17.12 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 setpoint offset when free cooling
- SAF: 0
- EAF: 0
Outdoor sensor placed in intake channel
No

For detailed description, see section 5.1.6 Free cooling.

17.13 Support control

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

<table>
<thead>
<tr>
<th>Support control</th>
<th>active: Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>EAF running during support contr: Yes</td>
<td></td>
</tr>
</tbody>
</table>

Minimum running time

| Min run time for support ctrl: 20 min |

For detailed description, see 5.1.5 Support control.

17.14 CO₂ Demand control

<table>
<thead>
<tr>
<th>CO₂/VOC active</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type: Dampers</td>
<td></td>
</tr>
<tr>
<td>Min. time: 20 min</td>
<td></td>
</tr>
</tbody>
</table>

Activation level

| 1/2-speed: 800 ppm |
| 1/1-speed: 1000 ppm |
| diff: 160 ppm |

For detailed description, see the section Demand control.

17.15 Fire function

Fire dampers are normally configured to open on fire alarm. However, they can be configured to be normally open instead via the display. You can use E tool® to configure the air handling unit’s running mode on fire alarm. The following options are available: "stopped", "continuous run", "run via normal start/stop conditions", "only supply air fan in operation” or "only extract air fan in operation”.

As of software version 3.2, fire alarm priority has been altered so that the unit will not stop for any other alarm (e.g. frost protection) when it has been configured for continued operation during fire alarms. The digital input “external switch” will still stop the unit.

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

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

<table>
<thead>
<tr>
<th>Fire damper function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not active</td>
</tr>
<tr>
<td>Operation when alarm</td>
</tr>
<tr>
<td>Stopped</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Damper exercise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Running time: 90 s</td>
</tr>
<tr>
<td>Interval in days: 1</td>
</tr>
<tr>
<td>Hour for exerc: 00</td>
</tr>
</tbody>
</table>

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.

17.16 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".

<table>
<thead>
<tr>
<th>Humidity control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humid-/Dehumidificat</td>
</tr>
<tr>
<td>Start limit: 15%</td>
</tr>
<tr>
<td>Stop limit: 5%</td>
</tr>
</tbody>
</table>

For a detailed description, see the section Humidity control.

17.17 Exchanger de-icing

<table>
<thead>
<tr>
<th>Exchanger deicing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
</tr>
</tbody>
</table>

De-icing parameters

| Setp deicing: -3.0°C |
| Hysteresis: 1.0 °C |
| Stop temp SAF: -10.0 ° |
| Min. run time: 5 min |

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

17.18 Cooling recovery

<table>
<thead>
<tr>
<th>Cooling recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
</tr>
<tr>
<td>Cooling limit: 0.0°C</td>
</tr>
</tbody>
</table>

Cooling limit is the difference in temperature between extract air and outdoor air.
For details, see section 5.1.7 Cooling recovery.

17.19 Minimum limit dampers

<table>
<thead>
<tr>
<th>Min limit dampers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not active</td>
</tr>
<tr>
<td>Min limit: 5%</td>
</tr>
</tbody>
</table>

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

Cooling recovery
run when enthalpy is
greater outd than
indoors : Active

For a detailed description, see section 5.1.8 Enthalpy control.

17.21 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 | Not active | Min setp: 12.0°C | Max setp: 30.0°C |

For details, see section 5.1.10 External setpoint.

17.22 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 Supply Air Fan external operation and alarm 34 Extract Air Fan external operation 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 prot | EAF: Motor prot |

| Run ind/Motor prot | P1 heat: Motor prot | P1 exch: Motor prot | P1 cool: Motor prot |

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 Indication" or "EAF Indication" must then be configured. The setting "Run indication/Motor protection SAF" or "EAF Indication" 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 "SAF Indication" or "EAF Indication" is activated.

### 17.23 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.

<table>
<thead>
<tr>
<th>Actuator type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y1 heating: 0-10V</td>
</tr>
<tr>
<td>Y2 exchan.: 0-10V</td>
</tr>
<tr>
<td>Y3 cooling: 0-10V</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Actuator type</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAF: 0-10V</td>
</tr>
<tr>
<td>EAF: 0-10V</td>
</tr>
<tr>
<td>Split: 0-10V</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Actuator type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humidity: 0-10V</td>
</tr>
<tr>
<td>Extra unit: 0-10V</td>
</tr>
<tr>
<td>Y1 Heat/Y3 cool: 0-10V</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Actuator type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y4 extra seq: 0-10V</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Actuator type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y5 extra seq: 0-10V</td>
</tr>
</tbody>
</table>

**NOTE:** Even though 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.

### 17.24 Running time, 3-position 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.

<table>
<thead>
<tr>
<th>Actuator run time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating: 255 s</td>
</tr>
<tr>
<td>Exchanger: 255 s</td>
</tr>
<tr>
<td>Cooling: 255 s</td>
</tr>
</tbody>
</table>
17.25 Step controllers

17.25.1 Step controller heating
Step controller heating can be set to sequential or binary.

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

<table>
<thead>
<tr>
<th>Step</th>
<th>Start</th>
<th>Stop</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10%</td>
<td>5%</td>
</tr>
<tr>
<td>2</td>
<td>45%</td>
<td>40%</td>
</tr>
<tr>
<td>3</td>
<td>70%</td>
<td>65%</td>
</tr>
<tr>
<td>4</td>
<td>95%</td>
<td>90%</td>
</tr>
</tbody>
</table>

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

Nbr of steps: 4
Minimum on/off time: 60 s
Hyst: 0.5%

17.25.2 Step controller cooling

"Step controller Cooling” can be set to sequential or binary.

"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

<table>
<thead>
<tr>
<th>Step</th>
<th>Start</th>
<th>Stop</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10%</td>
<td>5%</td>
</tr>
<tr>
<td>2</td>
<td>50%</td>
<td>45%</td>
</tr>
<tr>
<td>3</td>
<td>95%</td>
<td>90%</td>
</tr>
</tbody>
</table>

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

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

### 17.25.3 Step controllers Change-over

The digital output signals "Heating/cooling step 1", "Heating/cooling step 2" and "Heating/cooling step 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”.

### 17.26 Recirculation

Recirculation is a function for distributing the air in the room using the supply air fan. The extract air fan can also be used, if desired. 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.

Either a digital output (Recirculation damper) or an analogue output (Y4 Extra sequence) can be used as an output signal. When Y4 Extra sequence is used, the damper will become modulating.

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 can either have a unique setpoint or follow the supply air setpoint, with an adjustable offset. 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.

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

To lower the temperature, it is possible to configure free cooling to be used during recirculation, if the conditions for free cooling are fulfilled.
Recirculation is activated either via a digital input signal or by connecting it to "Timer output 5".

The extract air fan can be selected to run during recirculation.

17.27 Pretreatment

Control of dampers and pump for preheated or pre-cooled outdoor air via an underground intake channel. The digital output "Pretreatment" is set to preheating when the unit is started and the outdoor temperature is below the set heating start limit (default 8°C) or to precooling when the outdoor temperature is above the set cooling start limit (default 19°C).

If the outdoor temperature exceeds the set heating start limit by more than 1°C (fixed), preheating will be aborted, as well as if the outdoor temperature falls below the cooling start limit by 1°C.

If a sensor is configured in the intake duct ("intaketemp") this temperature will be compared with the outdoor temperature. If the temperature in the intake duct does not exceed the outdoor temperature by more than 1°C (adjustable) 5 minutes (fixed) after start-up when using preheating, preheating will be aborted. The same conditions apply to precooling, i.e. if the intake temperature is not more than 1°C (adjustable) cooler than the outdoor temperature, precooling will be aborted.

Pretreatment always starts at start-up of the unit, if the outdoor temperature so permits. If pretreatment is aborted due to a small difference between the intake temperature and the outdoor temperature, pretreatment will be blocked for 6 hours. Then pretreatment will start (if the outdoor temperature so permits) and run for at least 5 minutes.

17.28 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" or "not active". The extra stop function gives, for each alarm, the option to stop or not stop the unit on alarm activation.
### 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.

<table>
<thead>
<tr>
<th>Alarm text</th>
<th>Pri</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malfunction supply air fan</td>
<td>B</td>
<td>Malfunction supply air fan</td>
</tr>
<tr>
<td>Malfunction extract air fan</td>
<td>B</td>
<td>Malfunction extract air fan</td>
</tr>
<tr>
<td>Malfunction P1 heater</td>
<td>B</td>
<td>Malfunction pump, heating circuit</td>
</tr>
<tr>
<td>Malfunction P1 cooler</td>
<td>B</td>
<td>Malfunction pump, cooling circuit</td>
</tr>
<tr>
<td>Malfunction P1 exchanger</td>
<td>B</td>
<td>Malfunction pump, liquid connected exchanger</td>
</tr>
<tr>
<td>Filter guard 1</td>
<td>B</td>
<td>Filter guard pressure switch or analogue filter switch activated. Analogue filter switch depends on the flow.</td>
</tr>
<tr>
<td>Flow guard</td>
<td>B</td>
<td>Flow switch activated</td>
</tr>
<tr>
<td>External frost guard</td>
<td>A</td>
<td>External frost protection thermostat activated</td>
</tr>
<tr>
<td>Deicing pressure guard</td>
<td>-</td>
<td>Exchanger de-icing pressure switch activated</td>
</tr>
<tr>
<td>Fire alarm</td>
<td>A</td>
<td>Fire alarm activated</td>
</tr>
<tr>
<td>External switch</td>
<td>C</td>
<td>“External switch” activated</td>
</tr>
<tr>
<td>External alarm</td>
<td>B</td>
<td>External alarm activated</td>
</tr>
<tr>
<td>Supply air control error</td>
<td>B</td>
<td>Supply air temp deviates too much from the setpoint for too long.</td>
</tr>
<tr>
<td>Humidity control error</td>
<td>-</td>
<td>The room humidity deviates too much from the setpoint.</td>
</tr>
<tr>
<td>High supply air temp</td>
<td>B</td>
<td>Supply air temp too high</td>
</tr>
<tr>
<td>Low supply air temp</td>
<td>B</td>
<td>Supply air temp too low</td>
</tr>
<tr>
<td>Supply air temp max limit</td>
<td>-</td>
<td>Maximum limiting of supply air temp active</td>
</tr>
<tr>
<td>Supply air temp min limit</td>
<td>-</td>
<td>Minimum limiting of supply air temp active</td>
</tr>
<tr>
<td>High room temp</td>
<td>B</td>
<td>Room temp too high during room temp control</td>
</tr>
<tr>
<td>Low room temp</td>
<td>B</td>
<td>Room temp too low during room temp control</td>
</tr>
<tr>
<td>High extract air temp</td>
<td>B</td>
<td>High extract air temp during extract air control</td>
</tr>
<tr>
<td>Low extract air temp</td>
<td>B</td>
<td>Low extract air temp during extract air control</td>
</tr>
<tr>
<td>Electric heating is overheated</td>
<td>A</td>
<td>Heater high temperature limit switch activated</td>
</tr>
<tr>
<td>Frost risk</td>
<td>B</td>
<td>Frost protection function is overriding the control of the heater output</td>
</tr>
<tr>
<td>Low frost guard temp</td>
<td>A</td>
<td>Frost protection temperature below frost limit value</td>
</tr>
<tr>
<td>Low efficiency</td>
<td>B</td>
<td>Heat exchanger efficiency below limit value</td>
</tr>
<tr>
<td>Sensor error outdoor temp</td>
<td>B</td>
<td>Malfunction of connected sensor</td>
</tr>
<tr>
<td>Alarm text</td>
<td>Pri</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-----</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>28 Analogue deicing</td>
<td></td>
<td>Exchanger de-icing activated by de-icing sensor</td>
</tr>
<tr>
<td>29 Rotation sentinel exchanger</td>
<td>B</td>
<td>Exchanger rotation sentinel alarm activated</td>
</tr>
<tr>
<td>30 Malfunction fire damper</td>
<td>B</td>
<td>Fire damper exercise test failed</td>
</tr>
<tr>
<td>31 Supply air fan control error</td>
<td></td>
<td>Supply air pressure deviates too much from the setpoint for too long.</td>
</tr>
<tr>
<td>32 Extract air fan control error</td>
<td></td>
<td>Extract air pressure deviates too much from the setpoint for too long.</td>
</tr>
<tr>
<td>33 Supply air fan external</td>
<td>C</td>
<td>SAF run-signal received when unit is stopped</td>
</tr>
<tr>
<td>34 Extract air fan external</td>
<td>C</td>
<td>EAF run-signal received when unit is stopped</td>
</tr>
<tr>
<td>35 Ventilation manual mode</td>
<td>C</td>
<td>The unit is in manual mode</td>
</tr>
<tr>
<td>36 Manual supply air control</td>
<td>C</td>
<td>Supply air temp controller in manual control</td>
</tr>
<tr>
<td>37 Manual supply air fan mode</td>
<td>C</td>
<td>Supply air fan in manual control</td>
</tr>
<tr>
<td>38 Manual supply air fan freq</td>
<td>C</td>
<td>The SAF is in manual mode</td>
</tr>
<tr>
<td>39 Manual extract air fan mode</td>
<td>C</td>
<td>Extract air fan in manual control</td>
</tr>
<tr>
<td>40 Manual extract air fan freq</td>
<td>C</td>
<td>The EAF is in manual mode</td>
</tr>
<tr>
<td>41 Manual heater control</td>
<td>C</td>
<td>The heater is in manual mode</td>
</tr>
<tr>
<td>42 Manual exchanger control</td>
<td>C</td>
<td>Heat exchanger output in manual control</td>
</tr>
<tr>
<td>43 Manual cooler control</td>
<td>C</td>
<td>Cooling output in manual control</td>
</tr>
<tr>
<td>44 Manual P1 heater</td>
<td>C</td>
<td>Heating circulation pump in manual control</td>
</tr>
<tr>
<td>45 Manual P1 exchanger</td>
<td>C</td>
<td>Exchanger circulation pump in manual control</td>
</tr>
<tr>
<td>46 Manual P1 cooler</td>
<td>C</td>
<td>Cooling circulation pump in manual control</td>
</tr>
<tr>
<td>47 Manual fire damper</td>
<td>C</td>
<td>Fire dampers in manual control</td>
</tr>
<tr>
<td>48 Internal battery error</td>
<td>A</td>
<td>Internal battery needs replacing</td>
</tr>
<tr>
<td>49 Sensor error supply air temp</td>
<td>B</td>
<td>Malfunction of connected sensor</td>
</tr>
<tr>
<td>50 Sensor error extract air temp</td>
<td>B</td>
<td>Malfunction of connected sensor</td>
</tr>
<tr>
<td>51 Sensor error room temp 1</td>
<td>B</td>
<td>Malfunction of connected sensor</td>
</tr>
<tr>
<td>52 Sensor error room temp 2</td>
<td>B</td>
<td>Malfunction of connected sensor</td>
</tr>
<tr>
<td>53 Sensor error exhaust air temp</td>
<td>B</td>
<td>Malfunction of connected sensor</td>
</tr>
<tr>
<td>54 Sensor error extra sensor 1</td>
<td>B</td>
<td>Sensor error Extra sensor 1</td>
</tr>
<tr>
<td>55 Sensor error SAF pressure</td>
<td>B</td>
<td>Malfunction of connected sensor</td>
</tr>
<tr>
<td>56 Sensor error EAF pressure</td>
<td>B</td>
<td>Malfunction of connected sensor</td>
</tr>
<tr>
<td>57 Sensor error deicing temp</td>
<td>B</td>
<td>Malfunction of connected sensor</td>
</tr>
<tr>
<td>58 Sensor error frost protection temp</td>
<td></td>
<td>Malfunction of connected sensor</td>
</tr>
<tr>
<td>59 Sensor error CO2</td>
<td>B</td>
<td>Malfunction of connected sensor</td>
</tr>
<tr>
<td>60 Sensor error humidity room</td>
<td>B</td>
<td>Malfunction of connected sensor</td>
</tr>
<tr>
<td>61 Sensor error humidity duct</td>
<td>B</td>
<td>Malfunction of connected sensor</td>
</tr>
<tr>
<td>62 Sensor error extra unit temp</td>
<td>B</td>
<td>Malfunction of connected sensor</td>
</tr>
<tr>
<td>63 Sensor error external control SAF</td>
<td></td>
<td>Malfunction of connected sensor</td>
</tr>
<tr>
<td>Alarm text</td>
<td>Pri</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-----</td>
<td>-------------------------------------------------------</td>
</tr>
<tr>
<td>64 Sensor error external control EAF</td>
<td>B</td>
<td>Malfunction of connected sensor</td>
</tr>
<tr>
<td>65 Sensor error SAF pressure 2</td>
<td>B</td>
<td>Malfunction of connected sensor</td>
</tr>
<tr>
<td>66 Sensor error outdoor humidity</td>
<td>B</td>
<td>Malfunction of connected sensor</td>
</tr>
<tr>
<td>67 Sensor error intake temp</td>
<td>B</td>
<td>Malfunction of connected sensor</td>
</tr>
<tr>
<td>68 Sensor error extra sensor 2</td>
<td>B</td>
<td>Malfunction of connected sensor</td>
</tr>
<tr>
<td>69 Sensor error extra sensor 3</td>
<td>B</td>
<td>Malfunction of connected sensor</td>
</tr>
<tr>
<td>70 Sensor error extra sensor 4</td>
<td>B</td>
<td>Malfunction of connected sensor</td>
</tr>
<tr>
<td>71 Sensor error extra sensor 5</td>
<td>B</td>
<td>Malfunction of connected sensor</td>
</tr>
<tr>
<td>72 Sensor error extra SAF pressure</td>
<td>B</td>
<td>Malfunction of connected sensor</td>
</tr>
<tr>
<td>73 Sensor error extra EAF pressure</td>
<td>B</td>
<td>Malfunction of connected sensor</td>
</tr>
<tr>
<td>77 Alarm frequency converter SAF</td>
<td>A</td>
<td>Malfunction of frequency converter SAF</td>
</tr>
<tr>
<td>78 Alarm frequency converter EAF</td>
<td>A</td>
<td>Malfunction of frequency converter EAF</td>
</tr>
<tr>
<td>79 Communication error frequency SAF</td>
<td>C</td>
<td>Communication error Vacon NXL/Lenze SMV/Omron V1000/Emerson</td>
</tr>
<tr>
<td>80 Alarm frequency converter EAF</td>
<td>C</td>
<td>Communication error Vacon NXL/Lenze SMV/Omron V1000/Emerson</td>
</tr>
<tr>
<td>81 Communication error expansion unit 1</td>
<td>C</td>
<td>Communication problem with connected expansion unit</td>
</tr>
<tr>
<td>82 Communication error expansion unit 2</td>
<td>C</td>
<td>Communication problem with connected expansion unit</td>
</tr>
<tr>
<td>83 Warning frequency converter SAF</td>
<td>C</td>
<td>Alarm from frequency converter via Modbus communication</td>
</tr>
<tr>
<td>84 Warning frequency converter EAF</td>
<td>C</td>
<td>Alarm from frequency converter via Modbus communication</td>
</tr>
<tr>
<td>85 Output in manual mode</td>
<td>C</td>
<td>Analogue or digital output in manual mode</td>
</tr>
<tr>
<td>86 Time for service</td>
<td>C</td>
<td>Time for service</td>
</tr>
<tr>
<td>87 Y4 extra sequence control manual</td>
<td>C</td>
<td>Y4-Extra sequence in manual control</td>
</tr>
<tr>
<td>88 Restart blocked after power-on</td>
<td>B</td>
<td>Restart blocked due to earlier power failure</td>
</tr>
<tr>
<td>89 Y5 extra sequence control manual</td>
<td>C</td>
<td>Y5 Extra sequence in manual control</td>
</tr>
<tr>
<td>90 Filter guard 2</td>
<td>B</td>
<td>Filter guard pressure switch or analog filter switch activated. Analog filter switch depends on the flow.</td>
</tr>
<tr>
<td>91 High temp extra sensor 1</td>
<td>-</td>
<td>High temperature extra sensor 1</td>
</tr>
<tr>
<td>92 Low temp extra sensor 1</td>
<td>-</td>
<td>Low temperature extra sensor 1</td>
</tr>
<tr>
<td>93 High temp extra sensor 2</td>
<td>-</td>
<td>High temperature extra sensor 2</td>
</tr>
<tr>
<td>94 Low temp extra sensor 2</td>
<td>-</td>
<td>Low temperature extra sensor 2</td>
</tr>
<tr>
<td>95 High temp extra sensor 3</td>
<td>-</td>
<td>High temperature extra sensor 3</td>
</tr>
<tr>
<td>96 Low temp extra sensor 3</td>
<td>-</td>
<td>Low temperature extra sensor 3</td>
</tr>
<tr>
<td>97 High temp extra sensor 4</td>
<td>-</td>
<td>High temperature extra sensor 4</td>
</tr>
<tr>
<td>98 Low temp extra sensor 4</td>
<td>-</td>
<td>Low temperature extra sensor 4</td>
</tr>
<tr>
<td>Alarm text</td>
<td>Pri</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>-----</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>99 High temp extra sensor 5</td>
<td></td>
<td>High temperature extra sensor 5</td>
</tr>
<tr>
<td>100 Low temp extra sensor 5</td>
<td></td>
<td>Low temperature extra sensor 5</td>
</tr>
<tr>
<td>101 Extra alarm 1</td>
<td></td>
<td>Extra alarm 1 on digital input</td>
</tr>
<tr>
<td>102 Extra alarm 2</td>
<td></td>
<td>Extra alarm 2 on digital input</td>
</tr>
<tr>
<td>103 Extra alarm 3</td>
<td></td>
<td>Extra alarm 3 on digital input</td>
</tr>
<tr>
<td>104 Extra alarm 4</td>
<td></td>
<td>Extra alarm 4 on digital input</td>
</tr>
<tr>
<td>105 Extra alarm 5</td>
<td></td>
<td>Extra alarm 5 on digital input</td>
</tr>
<tr>
<td>106 Extra alarm 6</td>
<td></td>
<td>Extra alarm 6 on digital input</td>
</tr>
<tr>
<td>107 Extra alarm 7</td>
<td></td>
<td>Extra alarm 7 on digital input</td>
</tr>
<tr>
<td>108 Extra alarm 8</td>
<td></td>
<td>Extra alarm 8 on digital input</td>
</tr>
<tr>
<td>109 Extra alarm 9</td>
<td></td>
<td>Extra alarm 9 on digital input</td>
</tr>
<tr>
<td>110 Extra alarm 10</td>
<td></td>
<td>Extra alarm 10 on digital input</td>
</tr>
<tr>
<td>111 Extra unit in manual mode</td>
<td></td>
<td>Extra unit is in manual mode</td>
</tr>
<tr>
<td>112 Malfunction motor control 1</td>
<td></td>
<td>Malfunction motor control 1</td>
</tr>
<tr>
<td>113 Malfunction motor control 2</td>
<td></td>
<td>Malfunction motor control 2</td>
</tr>
<tr>
<td>114 Motor control 1 external operation</td>
<td></td>
<td>Motor control 1 external operation</td>
</tr>
<tr>
<td>115 Motor control 2 external operation</td>
<td></td>
<td>Motor control 2 external operation</td>
</tr>
</tbody>
</table>

17.29 Communication

17.29.1 Modbus communication

Corrido can be connected to a network for Modbus communication.

<table>
<thead>
<tr>
<th>Modbus communication slave, port 1 Not Active</th>
</tr>
</thead>
</table>

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

Modbus communication takes place using 1 stop bit.

<table>
<thead>
<tr>
<th>Modbus address: 1</th>
<th>Speed: 9600 bps</th>
<th>Two stop bits: Yes</th>
<th>Parity: No</th>
</tr>
</thead>
</table>

NOTE: Only one stop bit can be used.

Slave

For connection to E tool® and a Modbus SCADA system.

| Function port1 ➔ Slave |
Expansion unit

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

<table>
<thead>
<tr>
<th>Expansion unit1</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expansion unit2</td>
<td>None</td>
</tr>
</tbody>
</table>

To initiate the expanded controllers, select "Expansion unit" at start-up (see below). If the controller does not contain 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 a second generation Corrigo (…S). After initiating the expansion units and setting the master controller, all inputs and outputs are available for configuration in the master controller under "Configuration" / "Inputs/Outputs" (the expansion units’ in-/outputs are named Exp1/Exp2).

<table>
<thead>
<tr>
<th>Ventilation</th>
<th>Heating</th>
<th>Boiler</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expansion unit1</td>
<td>Expansion unit2</td>
<td></td>
</tr>
</tbody>
</table>

Frequency converters

Up to two separate Vacon NXL / Lenze SMV / Omron V1000 / Emerson Commander / LS iG5a / LS i57 / EBM-PABST / Danfoss FC 101/ ABB ACS/ ECLNse frequency converters can be controlled via modbus communication. Corrigo can manage two supply air fans in parallel and two extract air fans in parallel. 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 “Appendix 1” at the end of this manual.

The Corrigo Modbus settings are listed below. They are not adjustable and must also be set in the current frequency converters.

Modbus address: Supply air fan = 1, Extract air fan = 2, Parallel supply air fan = 3, Parallel extract air fan = 4

Speed: 9600 bps, 1 stop bit, no parity

For additional settings for every model, see Appendix 1 at the end of this document.

<table>
<thead>
<tr>
<th>Type of freq conv connected on Modbus</th>
<th>Vacon NXL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dual? No</td>
<td>No</td>
</tr>
</tbody>
</table>

External display

ED-TCV or ED/RU-RUD can be used as an external display.

<table>
<thead>
<tr>
<th>External display</th>
<th>None</th>
</tr>
</thead>
</table>

Expansion unit and frequency converters

Frequency converters can be used in combination with expansion units on the same port. The master controller will switch the port between Modbus and EXOline in order to communicate with the frequency converters via Modbus and with the expansion unit via EXOline.

<table>
<thead>
<tr>
<th>Function port 1</th>
<th>Exp and freq/press</th>
</tr>
</thead>
</table>
Press RIGHT to select which expansion units are to be connected.

<table>
<thead>
<tr>
<th>Expansion unit1</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expansion unit2</td>
<td>None</td>
</tr>
</tbody>
</table>

Then go a step down to select which frequency converters are to be connected. For additional settings for frequency converters, see appendix at the end of this document.

<table>
<thead>
<tr>
<th>Type of freq conv connected on Modbus</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dual? No</td>
<td></td>
</tr>
</tbody>
</table>

**Expansion unit and external display**

| Function port1 |  $\rightarrow$ | Exp and ext display |

An expansion unit and external display can be used on the same port simultaneously.

### 17.29.2 Function port 2

In a Corrigo with 3 ports, both serial ports have the same function. They can, however, not be configured to have the same function at the same time.

### 17.29.3 BACnet communication

In order to connect a Corrigo running a ventilation application to a SCADA system via BACnet/IP or BACnet MS/TP, a third generation Corrigo with a TCP/IP port or RS485 port is required. For BACnet MS/TP, a BACnet router must be used. BACnet communication cannot be activated via the display. It must instead be activated using E tool©.

For additional information, see the PICS document and variable list available via [www.regin.se](http://www.regin.se).

### 17.30 Other parameters

#### 17.30.1 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 e.g. to create a cool-down period when using electric heating. In order to avoid letting in too cold air, e.g. in the winter, the heat exchanger will continue to run during the stop delay.

<table>
<thead>
<tr>
<th>Delay SAF</th>
<th>Start: 60 s</th>
<th>Stop: 30 s</th>
</tr>
</thead>
</table>

| Delay EAF | Start: 0 s | Stop: 30 s |

#### 17.30.2 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.
17.30.3 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 |

17.30.4 Start delay exchanger

17.30.5 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 s  
| Alarm delay at start  
| 60 s |

For the function "Slave control of the extract air fan", the fan will start directly at 50 % after the start delay, in order for the heating of the exchanger to work for this operating mode. When the supply air fan starts, the extract air fan will be slave controlled by the flow in the supply air duct.

17.30.6 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", "Y4" and "Y5".

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.

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 %.

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 and between exchanger and heating.

### Split settings

**Exchanger**
- 0% at HCOut= 32%
- 100% at HCOut= 50%

**Heating**
- 0% at HCOut= 54%
- 100% at HCOut= 100%

**Cooling**
- 0% at HCOut= 30%
- 100% at HCOut= 0%

**Extra Sequence Y4**
- 0% at HCOut= 0%
- 100% at HCOut= 0%

**Extra Sequence Y5**
- 0% at HCOut= 0%
- 100% at HCOut= 0%

### 17.30.7 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
17.30.8 Split of optional temp. sequence

Any one of the analogue temperature control output sequences "Y1", "Y2" and "Y3", "Y1 Heating/Y3 Cooling", "Y4-extra sequence" or "Y5-extra sequence" 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.

<table>
<thead>
<tr>
<th>Split optional temperature sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y1 Y2 Y3</td>
</tr>
<tr>
<td>No split</td>
</tr>
</tbody>
</table>

17.30.9 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.

<table>
<thead>
<tr>
<th>Fast stop on alarm</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Electric heating is overheated&quot;: No</td>
</tr>
</tbody>
</table>

17.30.10 Automatic restart at power-up

The function ”Automatic restart at power-up” makes it possible to block automatic restart of the unit at power-up. At power-up, the B-alarm ”Restart blocked after power on” is generated. Once this alarm has been acknowledged, the unit will start.

| Automatically restart after power-on: Yes |

17.31 System

17.31.1 Change language

Use this menu to change the display language.

<table>
<thead>
<tr>
<th>Choose language</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
</tr>
</tbody>
</table>

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©.

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

There are five different to choose from.
Type 1
The text on the first line can be changed using E tool©.
The second line shows the date and time.
The third line shows the present running status.
The fourth line shows the present temperature setpoint and actual values.

<table>
<thead>
<tr>
<th>Vent unit 18 PX</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004-08-15 11:28</td>
</tr>
<tr>
<td>System: Running</td>
</tr>
<tr>
<td>Sp:22.0°C Act:21.8°C</td>
</tr>
</tbody>
</table>

Type 2
The first line shows the 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 the present temperature control output values.

<table>
<thead>
<tr>
<th>2004-08-15 11:28</th>
</tr>
</thead>
<tbody>
<tr>
<td>System: Running</td>
</tr>
<tr>
<td>Sp:22.0°C Act:21.8°C</td>
</tr>
<tr>
<td>Y1:0%  Y2:93% Y3:0%</td>
</tr>
</tbody>
</table>

Type 3
The first line shows the 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 the present SAF and EAF pressures.

<table>
<thead>
<tr>
<th>15/03/2004 11:28</th>
</tr>
</thead>
<tbody>
<tr>
<td>System: Running</td>
</tr>
<tr>
<td>Sp:22.0°C Act:21.8°C</td>
</tr>
<tr>
<td>SF:1100Pa EF:1050Pa</td>
</tr>
</tbody>
</table>

Type 4
The text on the first line can be changed using E tool©.
The second line shows the date and time.
The third line shows the present running status.

<table>
<thead>
<tr>
<th>Vent unit 18 PX</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004-03-15 11:28</td>
</tr>
<tr>
<td>System: Running</td>
</tr>
</tbody>
</table>

Type 5
The text on the first line can be changed using E tool©.
The second line shows the date and time.

<table>
<thead>
<tr>
<th>Vent unit 18 PX</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004-03-15 11:28</td>
</tr>
</tbody>
</table>
17.31.3 Automatic summer-/wintertime change-over

When Corrigo is set on automatic summertime/wintertime change-over, the timer will automatically change between summertime and wintertime according to European standard.

<table>
<thead>
<tr>
<th>Automatic summer/</th>
<th>winter time</th>
<th>change-over</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

17.31.4 Address

Corrigo uses the addresses below when connecting to 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.

<table>
<thead>
<tr>
<th>Address</th>
<th>PLA: 254</th>
<th>ELA: 254</th>
</tr>
</thead>
</table>

17.31.5 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.

<table>
<thead>
<tr>
<th>Address for remote communication (PLA:ELA)</th>
<th>00:00</th>
</tr>
</thead>
</table>

17.31.6 Automatic logoff

If the access level is Operator, Service or Admin, 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.

<table>
<thead>
<tr>
<th>Time before user is automatically logged off:</th>
<th>60</th>
</tr>
</thead>
</table>

| (Unit 5 s) |       |       |

17.31.7 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.

<table>
<thead>
<tr>
<th>Activate wizard</th>
<th>No</th>
</tr>
</thead>
</table>
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, on the front of the Corrigo / E3-DSP.

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. The LED is then lit.

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. Four lines of 20 characters.

18.3 Revision number

If RIGHT is pressed twice when the start-menu is shown, a menu showing the program revision number, i.e. the date on which the program was created, and the Corrigo ID number (not to be confused with its serial number) is displayed.
18.4 Language

When the start menu is displayed, pressing the RIGHT button three times will display a menu 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 master controller. For controllers with display, the alarm indication and change mode LEDs are located in the keypad area.

**Status indication**

<table>
<thead>
<tr>
<th>Designation</th>
<th>Colour</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tx</td>
<td>Green</td>
<td>Port 1, Transmitting</td>
</tr>
<tr>
<td>Rx</td>
<td>Green</td>
<td>Port 1, Receiving</td>
</tr>
<tr>
<td>Serv (...LON models)</td>
<td>Yellow</td>
<td>Service LED LON, commissioning</td>
</tr>
<tr>
<td>LAN (...W models)</td>
<td>Yellow/Green</td>
<td>Green: Connected to other network equipment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blinking green: Network traffic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blinking yellow: For identifying</td>
</tr>
<tr>
<td>P/B (Power/Battery)</td>
<td>Green/Red</td>
<td>Power on/Battery error</td>
</tr>
</tbody>
</table>

**Controllers with built-in display**

<table>
<thead>
<tr>
<th>Designation</th>
<th>Colour</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>📘</td>
<td>Red</td>
<td>Alarm indication</td>
</tr>
<tr>
<td>🔄</td>
<td>Yellow</td>
<td>Change mode</td>
</tr>
</tbody>
</table>

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:** 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.
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: 2013-11-25
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: 09:00 – 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

The last menu is used to 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 during further use.
18.8 Energy calculation

The total energy consumption of the air handling unit can be obtained by internally calculating the various partial outputs of system components. By combining the various outputs of heaters/coolers, fans, etc., current power consumption is calculated based on their combined output.

18.9 SFP (Specific Fan Power)

If fans are used that are controlled by frequency converters connected via Modbus and which also supply information on motor output, the Corrigo is capable of calculating SFP using the following formula:

\[
SFP = \frac{\text{Total effect from both fans}}{\text{Supply air fan flow in kW}} \times \frac{1}{(\text{m}^3/\text{s})}.
\]

“Extra pressure transmitter supply air” is always used to measure flow, if connected. Otherwise “SAF Pressure” will be used or, alternatively, “SAF Pressure 2” if fan control is “Frequency control SAF with EAF flow control”.

Power loss as a percentage of the frequency converter can be added for calculating the total output. If, for instance, power loss is 5%, the total output will be as follows:

\[
\text{Total output} = (\text{Supply air fan output} + \text{Extract air fan output}) \times 1.05.
\]

A daily and a monthly average (always 30 days) are also computed and presented in the display and in E too\textsuperscript{L}. SFP for the average values is calculated only when the unit is running.

The display image is located under the menu Running mode → Running mode unit:

<table>
<thead>
<tr>
<th>SFP: 0.0 kW/m³/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day: 0.0 kW/m³/s</td>
</tr>
<tr>
<td>Month: 0.0 kW/m³/s</td>
</tr>
<tr>
<td>Freq loss: 0 %</td>
</tr>
</tbody>
</table>
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Appendix
Appendix Frequency converters and pressure transmitters

Version 3.3 of Corrigo ventilation supports the frequency converters listed below:

- Vacon NXL
- Lenze
- Omron V1000
- Emerson Commander
- LS
- EBM
- Danfoss FC 101
- ABB ACS
- EC Blue
- HK Instruments pressure transmitter DPT-Dual-MOD-2500

When communicating via frequency converters through Modbus, it is sometimes necessary to change certain settings in the frequency converter.

Two parallel connected frequency converters for supply air and two parallel connected frequency converters for extract air can be run. The supply air fan will have address 1 and the parallel supply air fan address 3. The extract air fan will have address 2 and the parallel extract air fan address 4.

Below are described what settings are necessary in the various models:

**Vacon NXL**

No settings necessary. Vacon NXL frequency converters are controlled via Modbus. Communication, alarms and certain indications can be read.

The following signals can be read/written from/to the frequency converter:

<table>
<thead>
<tr>
<th>Address</th>
<th>Modbus register</th>
<th>Name</th>
<th>Scaling</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>32003, 42003</td>
<td>FB Speed reference (SP)</td>
<td>1000</td>
<td>%</td>
</tr>
<tr>
<td>2001</td>
<td>32001, 42001</td>
<td>FB Status word</td>
<td>-</td>
<td>Binary</td>
</tr>
<tr>
<td>11</td>
<td>30011, 40011</td>
<td>Acc. Motor output</td>
<td>1</td>
<td>kW</td>
</tr>
<tr>
<td>80</td>
<td>30080, 40080</td>
<td>Amount of decimals for Acc. Motor output</td>
<td>1</td>
<td>kWh</td>
</tr>
<tr>
<td>2103</td>
<td>32103, 42103</td>
<td>FB Motor speed</td>
<td>100</td>
<td>%</td>
</tr>
<tr>
<td>2105</td>
<td>32105, 42105</td>
<td>Motor speed</td>
<td>1</td>
<td>+/- Rpm</td>
</tr>
<tr>
<td>2106</td>
<td>32106, 42106</td>
<td>Current</td>
<td>100</td>
<td>A</td>
</tr>
<tr>
<td>2107</td>
<td>32107, 42107</td>
<td>Torque</td>
<td>10</td>
<td>+/- % (of nominal)</td>
</tr>
<tr>
<td>1501</td>
<td>31501, 41501</td>
<td>Output</td>
<td>1000</td>
<td>kW</td>
</tr>
<tr>
<td>2110</td>
<td>32110, 42110</td>
<td>DC voltage</td>
<td>1</td>
<td>V</td>
</tr>
<tr>
<td>2111</td>
<td>32111, 42111</td>
<td>Active error</td>
<td>-</td>
<td>Error code</td>
</tr>
<tr>
<td>2101</td>
<td>32101, 42101</td>
<td>FB Status word</td>
<td>-</td>
<td>Binär</td>
</tr>
</tbody>
</table>
The variables presented in the display of the Corrigo are:
Frequency (Hz), Current (A), Output (kW), Accumulated power (kWh).

**Lenze**

No settings necessary.

Lenze frequency converters are controlled via Modbus. Communication, alarms and certain indications can be read.

The following signals can be read/written from/to the frequency converter:

<table>
<thead>
<tr>
<th>Address</th>
<th>Modbus register</th>
<th>Name</th>
<th>Scaling</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>49</td>
<td>32049, 42049</td>
<td>Password</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>50</td>
<td>32050, 42050</td>
<td>Parameter version</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>45</td>
<td>30045, 40045</td>
<td>FB Speed reference (SP)</td>
<td>50</td>
<td>%</td>
</tr>
<tr>
<td>2</td>
<td>30002, 40002</td>
<td>FB Status word</td>
<td>-</td>
<td>Binary</td>
</tr>
<tr>
<td>512</td>
<td>32512, 42512</td>
<td>Acc. Motor output</td>
<td>1</td>
<td>kW</td>
</tr>
<tr>
<td>528</td>
<td>32528, 42528</td>
<td>Motor frequency</td>
<td>10</td>
<td>Hz</td>
</tr>
<tr>
<td>509</td>
<td>32509, 42509</td>
<td>Current</td>
<td>1</td>
<td>A</td>
</tr>
<tr>
<td>511</td>
<td>32511, 42511</td>
<td>Output</td>
<td>1000</td>
<td>kW</td>
</tr>
<tr>
<td>506</td>
<td>31506, 41506</td>
<td>DC voltage</td>
<td>1</td>
<td>V</td>
</tr>
<tr>
<td>30</td>
<td>32110, 42110</td>
<td>Active error</td>
<td>-</td>
<td>Error code</td>
</tr>
<tr>
<td>27</td>
<td>32027, 42027</td>
<td>FB Status word</td>
<td>-</td>
<td>Binary</td>
</tr>
</tbody>
</table>

The variables presented in the display of the Corrigo are:
Frequency (Hz), Current (A), Output (kW), Accumulated power (kWh).

**Omron V1000**

**Connected via RS485:**

- R+ is connected to S+
- R- is connected to S-
- R+/S+ is connected to B on port 1 or 2
- R-/S- is connected to A on port 1 or 2

**Parameters**

The following parameters must be set from the display of the frequency converter:

- H5-01 (0x425): Slave address, set to = 1 for Supply air fan and = 2 for Exhaust air fan
- H5-07 (0x42B): RTS Control, set to = 1 (enabled) for activation of RS485
- o1-03 (0x502): Frequency reference units, set to = 1 for 0-100%
- H5-03 (0x427): Parity, set to = 0 (no parity)

Default values should be used for remaining parameters. The following values may not be changed:

- H5-02 (0x426): Communication speed, default =3 (9600)
- H5-04 (0x428): Stopping method after communication error, default = 3 (no stop)
- H5-11 (0x43C): Communication Enter Function, default=1 (Enter command not necessary)
- H5-12 (0x43D): Run command, default=0 (bit 0=forward start/stop, bit 1= reverse
Omron frequency converters are controlled via Modbus. Communication, alarms and certain indications can be read.

The following signals can be read/written from/to the frequency converter:

<table>
<thead>
<tr>
<th>Address</th>
<th>Modbusregister</th>
<th>Namn</th>
<th>Skaln.</th>
<th>Typ</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>30003, 40003</td>
<td>FB Speed reference (SP)</td>
<td>10</td>
<td>%</td>
</tr>
<tr>
<td>2</td>
<td>30002, 40002</td>
<td>Password</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>36</td>
<td>30036, 40036</td>
<td>Motor frequency</td>
<td>100</td>
<td>Hz</td>
</tr>
<tr>
<td>63</td>
<td>30063, 40063</td>
<td>Motor speed</td>
<td>1</td>
<td>+/- Rpm</td>
</tr>
<tr>
<td>39</td>
<td>30039, 40039</td>
<td>Current</td>
<td>10</td>
<td>A</td>
</tr>
<tr>
<td>40</td>
<td>30040, 40040</td>
<td>Output</td>
<td>10</td>
<td>kW</td>
</tr>
<tr>
<td>38</td>
<td>30038, 40038</td>
<td>DC voltage</td>
<td>10</td>
<td>V</td>
</tr>
<tr>
<td>33</td>
<td>30033, 40033</td>
<td>Status change</td>
<td>-</td>
<td>Binary</td>
</tr>
<tr>
<td>34</td>
<td>30034, 40034</td>
<td>Alarm</td>
<td>-</td>
<td>Binary</td>
</tr>
<tr>
<td>93</td>
<td>30093, 40093</td>
<td>Acc. Motor output</td>
<td>1</td>
<td>kW</td>
</tr>
</tbody>
</table>

The variables presented in the display of the Corrigo are:
Frequency (Hz), Current (A), Output (kW), Accumulated power (kWh).

**Emerson Commander**

**Connections RS485-RJ45:**
- RJ45:2 (orange) is connected to B on port 1 or 2
- RJ45:7 (white/brown) is connected to A on port 1 or 2
- Eventual termination resistor is connected between RJ45:1 (white/orange) and RJ45:8 (brown).

If Modbus communication is not initialised after powering up, disconnect the termination resistor and try again.

**Terminals**
- Connect terminal B4 (Drive enabled) to B2 (+24V)
- Connect terminal B5 (Forward) to B2 (+24V)

**Parameters**
The following parameters must be set from the display of the frequency converter:
- 44: Slave address, set to = 1 (default) for Supply air fan and = 2 for Exhaust air fan
- 43: Baud rate: 9.6 (default: 19.2)
- Default values should be used for remaining parameters.

**Changing parameters**
- Deactivate the unit. The display should read “iH 0.0”. This is performed by opening terminal B4.
- Set parameter 10 to “L3”, i.e. all parameters up to and including 95 can then be altered.
- Set parameter 43 to 9.6 (9600 baud).

Emerson frequency converters are controlled via Modbus. Communication, alarms and certain indications can be read.

The following signals can be read/written from/to the frequency converter:

<table>
<thead>
<tr>
<th>Address</th>
<th>Modbus register</th>
<th>Name</th>
<th>Scaling</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>114</td>
<td>30114, 40114</td>
<td>Speed selection</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>18</td>
<td>30018, 40018</td>
<td>FB Speed reference (SP)</td>
<td>10</td>
<td>%</td>
</tr>
<tr>
<td>1038</td>
<td>31038, 41038</td>
<td>FB Status word</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>615</td>
<td>30615, 40615</td>
<td>Control switch</td>
<td>-</td>
<td>Binary</td>
</tr>
<tr>
<td>501</td>
<td>30501, 40501</td>
<td>Motor frequency</td>
<td>10</td>
<td>Hz</td>
</tr>
<tr>
<td>2</td>
<td>30002, 40002</td>
<td>Max speed</td>
<td>10</td>
<td>Hz</td>
</tr>
<tr>
<td>504</td>
<td>30504, 40504</td>
<td>Motor speed</td>
<td>1</td>
<td>+/- Rpm</td>
</tr>
<tr>
<td>402</td>
<td>30402, 40402</td>
<td>Current</td>
<td>10</td>
<td>A</td>
</tr>
<tr>
<td>503</td>
<td>30503, 40503</td>
<td>Output</td>
<td>10</td>
<td>kW</td>
</tr>
<tr>
<td>505</td>
<td>30505, 40505</td>
<td>DC voltage</td>
<td>1</td>
<td>V</td>
</tr>
<tr>
<td>1040</td>
<td>31040-41040</td>
<td>Status change</td>
<td>-</td>
<td>Binary</td>
</tr>
</tbody>
</table>

The variables presented in the display of the Corrigo are:
Frequency (Hz), Current (A), Output (kW), Accumulated power (kWh).

**LS**

LS frequency converters are controlled via Modbus. Communication, alarms and certain indications can be read.

**LS iG5A**

The following signals can be read/written from/to the frequency converter:

<table>
<thead>
<tr>
<th>Address</th>
<th>Modbus register</th>
<th>Name</th>
<th>Scaling</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>30005, 40005</td>
<td>FB Speed reference (SP)</td>
<td>10</td>
<td>%</td>
</tr>
<tr>
<td>6</td>
<td>30006, 40006</td>
<td>FB Status word</td>
<td>-</td>
<td>Binary</td>
</tr>
<tr>
<td>10</td>
<td>30010, 40010</td>
<td>Motor frequency</td>
<td>100</td>
<td>Hz</td>
</tr>
<tr>
<td>31</td>
<td>30031, 40031</td>
<td>Torque</td>
<td>100</td>
<td>%</td>
</tr>
<tr>
<td>21</td>
<td>30029, 40029</td>
<td>RPM</td>
<td>1</td>
<td>Rpm</td>
</tr>
<tr>
<td>9</td>
<td>30009, 40009</td>
<td>Motor current</td>
<td>10</td>
<td>A</td>
</tr>
<tr>
<td>13</td>
<td>30013, 40013</td>
<td>Output</td>
<td>10</td>
<td>kW</td>
</tr>
<tr>
<td>12</td>
<td>30012, 40012</td>
<td>Voltage</td>
<td>10</td>
<td>V</td>
</tr>
<tr>
<td>14</td>
<td>30014, 40014</td>
<td>Status change</td>
<td>-</td>
<td>Binary</td>
</tr>
<tr>
<td>15</td>
<td>30015, 40015</td>
<td>Alarm</td>
<td>-</td>
<td>Binary</td>
</tr>
<tr>
<td>29</td>
<td>30029, 40029</td>
<td>Alarm 2</td>
<td>-</td>
<td>Binary</td>
</tr>
</tbody>
</table>

The variables presented in the display of the Corrigo are:
Frequency (Hz), Current (A), Output (kW), Accumulated power (kWh).

**LS iS7**

The following signals can be read/written from/to the frequency converter:
<table>
<thead>
<tr>
<th>Address</th>
<th>Modbus register</th>
<th>Name</th>
<th>Scaling</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>30005,40005</td>
<td>FB Speed reference (SP)</td>
<td>10</td>
<td>%</td>
</tr>
<tr>
<td>6</td>
<td>30006,40006</td>
<td>FB Status word</td>
<td>-</td>
<td>Binary</td>
</tr>
<tr>
<td>10</td>
<td>30010,40010</td>
<td>Motor frequency</td>
<td>100</td>
<td>Hz</td>
</tr>
<tr>
<td>791</td>
<td>30791,40791</td>
<td>Torque</td>
<td>100</td>
<td>%</td>
</tr>
<tr>
<td>786</td>
<td>30786,40786</td>
<td>RPM</td>
<td>1</td>
<td>Rpm</td>
</tr>
<tr>
<td>784</td>
<td>30784,40784</td>
<td>Motor current</td>
<td>10</td>
<td>A</td>
</tr>
<tr>
<td>790</td>
<td>30790,40790</td>
<td>Output</td>
<td>10</td>
<td>kW</td>
</tr>
<tr>
<td>789</td>
<td>30789,40789</td>
<td>Voltage</td>
<td>10</td>
<td>V</td>
</tr>
<tr>
<td>14</td>
<td>30014,40014</td>
<td>Status change</td>
<td>-</td>
<td>Binary</td>
</tr>
<tr>
<td>816</td>
<td>30816,40816</td>
<td>Alarm</td>
<td>-</td>
<td>Binary</td>
</tr>
<tr>
<td>817</td>
<td>30817,40817</td>
<td>Alarm 2</td>
<td>-</td>
<td>Binary</td>
</tr>
</tbody>
</table>

**EBM-PAPST**

EBM frequency converters are controlled via Modbus. Communication, alarms and certain indications can be read.

The following signals can be read/written from/to the frequency converter:

<table>
<thead>
<tr>
<th>Address</th>
<th>Modbus register</th>
<th>Name</th>
<th>Scaling</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>53250</td>
<td>30250,40250</td>
<td>FB Speed reference (SP)</td>
<td>640</td>
<td>%</td>
</tr>
<tr>
<td>53249</td>
<td>30249,40249</td>
<td>FB Control word</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>53265</td>
<td>30265,40265</td>
<td>Torque</td>
<td>-</td>
<td>Rpm</td>
</tr>
<tr>
<td>53266</td>
<td>30266,40266</td>
<td>FB Status word</td>
<td>-</td>
<td>Binary</td>
</tr>
<tr>
<td>53267</td>
<td>30267,40267</td>
<td>Status change</td>
<td>-</td>
<td>Binary</td>
</tr>
<tr>
<td>53268</td>
<td>30268,40268</td>
<td>DC voltage</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>53269</td>
<td>30269,40269</td>
<td>Motor current</td>
<td>-</td>
<td>A</td>
</tr>
</tbody>
</table>

The variables presented in the display of the Corrigo are:

Frequency (Hz), Current (A), Output (kW), Accumulated power (kWh).

**Danfoss FC 101**

Danfoss frequency converters are controlled via Modbus. Communication, alarms and certain indications can be read.

The following signals can be read/written from/to the frequency converter:

<table>
<thead>
<tr>
<th>Address</th>
<th>Modbus register</th>
<th>Name</th>
<th>Scaling</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>3100</td>
<td>33100,43100</td>
<td>FB Speed reference (SP)</td>
<td>100</td>
<td>%</td>
</tr>
<tr>
<td>50000</td>
<td>350000,450000</td>
<td>FB Control word</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>16130</td>
<td>316130,416130</td>
<td>Motor frequency</td>
<td>10</td>
<td>Hz</td>
</tr>
<tr>
<td>16140</td>
<td>316140,416140</td>
<td>Current</td>
<td>100</td>
<td>A</td>
</tr>
<tr>
<td>16100</td>
<td>316100,416100</td>
<td>Output</td>
<td>1000</td>
<td>kW</td>
</tr>
<tr>
<td>16300</td>
<td>316300,416300</td>
<td>DC voltage</td>
<td>1</td>
<td>V</td>
</tr>
<tr>
<td>16030</td>
<td>316030,416030</td>
<td>Status change</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

The variables presented in the display of the Corrigo are:

Frequency (Hz), Current (A), Output (kW), Accumulated power (kWh).

**ECBlue**
ECBlue frequency converters are controlled via Modbus. Communication, alarms and certain indications can be read.

The following signals can be read/written from/to the frequency converter:

<table>
<thead>
<tr>
<th>Address</th>
<th>Modbus register</th>
<th>Name</th>
<th>Scale</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>30003,40003</td>
<td>FB Speed reference (SP)</td>
<td>1</td>
<td>%</td>
</tr>
<tr>
<td>5</td>
<td>30005,40005</td>
<td>FB Control word</td>
<td>-</td>
<td>0 = Off</td>
</tr>
<tr>
<td>15</td>
<td>30015,40015</td>
<td>RPM</td>
<td>-</td>
<td>Rpm</td>
</tr>
<tr>
<td>16</td>
<td>30016,40016</td>
<td>Current</td>
<td>100</td>
<td>A</td>
</tr>
<tr>
<td>34</td>
<td>30034,40034</td>
<td>Output</td>
<td>1</td>
<td>kW</td>
</tr>
<tr>
<td>21</td>
<td>30021,40021</td>
<td>DC voltage</td>
<td>1</td>
<td>V</td>
</tr>
<tr>
<td>13</td>
<td>30013,40013</td>
<td>Alarm</td>
<td>-</td>
<td>Error code</td>
</tr>
</tbody>
</table>

HK Instruments pressure transmitter DPT-Dual-MOD-2500

The following signals can be read/written from/to the pressure transmitter:

**Function 04: Read Input Register**

<table>
<thead>
<tr>
<th>Register</th>
<th>Parameter description</th>
<th>Data type</th>
<th>Value</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>3x0001</td>
<td>Program version</td>
<td>16 bit</td>
<td>0…1000</td>
<td>0,00…99,00</td>
</tr>
<tr>
<td>3x0002</td>
<td>Actual pressure A</td>
<td>16 bit</td>
<td>0…2500</td>
<td>0…2500 (Pa)</td>
</tr>
<tr>
<td>3x0003</td>
<td>Actual pressure B</td>
<td>16 bit</td>
<td>0…2500</td>
<td>0…2500 (Pa)</td>
</tr>
<tr>
<td>3x0004</td>
<td>Input 1 0…10 V</td>
<td>16 bit</td>
<td>0…100</td>
<td>0…100 %</td>
</tr>
<tr>
<td>3x0005</td>
<td>Input 1 PT1000</td>
<td>16 bit</td>
<td>500…500</td>
<td>50…+50C</td>
</tr>
<tr>
<td>3x0006</td>
<td>Input 1 NI1000</td>
<td>16 bit</td>
<td>-500…500</td>
<td>-50…+50C</td>
</tr>
<tr>
<td>3x0007</td>
<td>Input 1 NI1000-LG</td>
<td>16 bit</td>
<td>-500…500</td>
<td>-50…+50C</td>
</tr>
<tr>
<td>3x0008</td>
<td>Input 1 NTC10K</td>
<td>16 bit</td>
<td>-500…500</td>
<td>-50…+50C</td>
</tr>
<tr>
<td>3x0009</td>
<td>Input 2 0…10 V</td>
<td>16 bit</td>
<td>0…100</td>
<td>0…100 %</td>
</tr>
<tr>
<td>3x0010</td>
<td>Input 2 PT1000</td>
<td>16 bit</td>
<td>-500…500</td>
<td>-50…+50C</td>
</tr>
<tr>
<td>3x0011</td>
<td>Input 2 Ni1000</td>
<td>16 bit</td>
<td>-500…500</td>
<td>-50…+50C</td>
</tr>
<tr>
<td>3x0012</td>
<td>Input 2 NI1000-LG</td>
<td>16 bit</td>
<td>-500…500</td>
<td>-50…+50C</td>
</tr>
<tr>
<td>3x0013</td>
<td>Input 2 NTC10K</td>
<td>16 bit</td>
<td>-500…500</td>
<td>-50…+50C</td>
</tr>
</tbody>
</table>

**Function 02: Read Input Status**

<table>
<thead>
<tr>
<th>Register</th>
<th>Parameter description</th>
<th>Data type</th>
<th>Value</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1x0001</td>
<td>Input 1 BIN IN</td>
<td>Bit 0</td>
<td>0…1</td>
<td>Off</td>
</tr>
<tr>
<td>1x0002</td>
<td>Input 2 BIN IN</td>
<td>Bit 0</td>
<td>0…1</td>
<td>Off</td>
</tr>
</tbody>
</table>

**Function 05: Write Single Coil**

<table>
<thead>
<tr>
<th>Register</th>
<th>Parameter description</th>
<th>Data type</th>
<th>Value</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x0001</td>
<td>Reset</td>
<td>Bit 0</td>
<td>0…1</td>
<td>Off</td>
</tr>
<tr>
<td>Register</td>
<td>Parameter description</td>
<td>Data type</td>
<td>Value</td>
<td>Area</td>
</tr>
<tr>
<td>----------</td>
<td>------------------------------</td>
<td>-----------</td>
<td>----------</td>
<td>------------------</td>
</tr>
<tr>
<td>4x0001</td>
<td>Beta value of NTC termistor</td>
<td>16 bit</td>
<td>1...30000</td>
<td>1...30000 (Default: 4220)</td>
</tr>
</tbody>
</table>