Corrigo E - manual

Heating application

REGIN

THE CHALLENGER IN BUILDING AUTOMATION

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Table of contents

Chapter 1 About the manual

This manual covers all the models in the Corrigo E series loaded with heating application. This revision covers program revisions from 3.0-1-00.

More information

More information about Corrigo E can be found in:

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

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

Chapter 2 About Corrigo E

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

In each model of Corrigo E generation 2, all applications are loaded in a separate memory area. The models have item number E... -S (where S stands for Second generation). From version 3.0, there are models with two communication ports. By connecting one/two expansion controllers to port two on these units, it is possible to increase the number of inputs and outputs. The 2-port Corrigo models have article number E...2-S (where the number two stands for 2 ports). For more detailed information, see chapter 10.

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

All 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.

News in version 3.0

- Updated and reconstructed menu system
- Possibility to connect expansion controllers. See section 8.16.2 and chapter 10.
- Models with two ports for connection of M-Bus meters. See section 8.16.2 and chapter 10.
- Control circuit for cooling. See section 5.2.
- Dew point control. See section 5.2.
- Optimizer function. See section 5.1.10.
- Updated function for boiler control. See section 5.6.

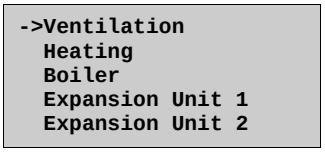
Application choice

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

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

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

Then press OK to confirm.



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

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

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

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

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

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

```
Heating Regulator
 08:06:03   09:32
HS1
Sp: 19.5  Act: 20.1°C
```

Heating application

The temperature controllers are PI-controllers for heating control, cooling control and PID for domestic hot water control with a pre-programmed set of control modes. A number of different control functions as well as analogue and digital input and output functions can be bound to these controllers. The choice of which functions are to be used is free, the only restriction is the physical number of inputs and outputs of the different models. The maximum number of I/Os is 3*28 (a 2-port Corrigo with two expansion controllers).

The Corrigo is designed for DIN-rail mounting.

The heating control includes, apart from other things, the following functions:

Heating control

Control of 1 - 3 heating systems with outdoor compensated supply temperature and optional room temperature influence via a room sensor.

Optimizer function

Optimising the start time in order to reach comfort temperature after economy mode.

Cooling control

Control of a cooling system with dew point control

Domestic hot water

1 or 2 domestic hot water circuits and 1 storage-tank charger circuit.

Differential pressure control of pump

One constant differential pressure control circuit.

Boiler control

Basic 2-step boiler control.

Timer outputs

Up to 5 individually settable timer outputs for control of lighting, doorlocks etc.

Timer control

Year-based clock, individual schedulers, holiday scheduler.

Water monitoring

Energy monitoring

Corrigo E hardware overview

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

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

Corrigo E model overview

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

Technical data

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

Battery

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

Communication

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

CE-marking

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

Inputs

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

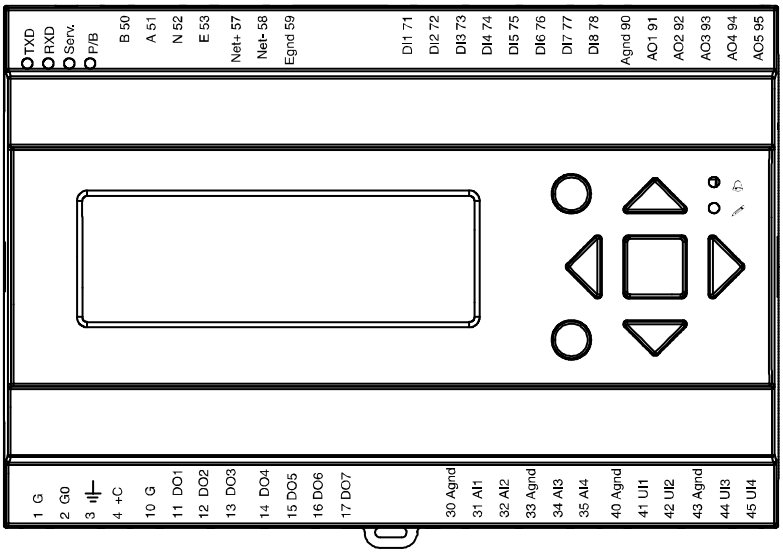
Outputs

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

Optioner

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

Position of the terminals on Corrigo E



Chapter 3 **Installation and wiring**

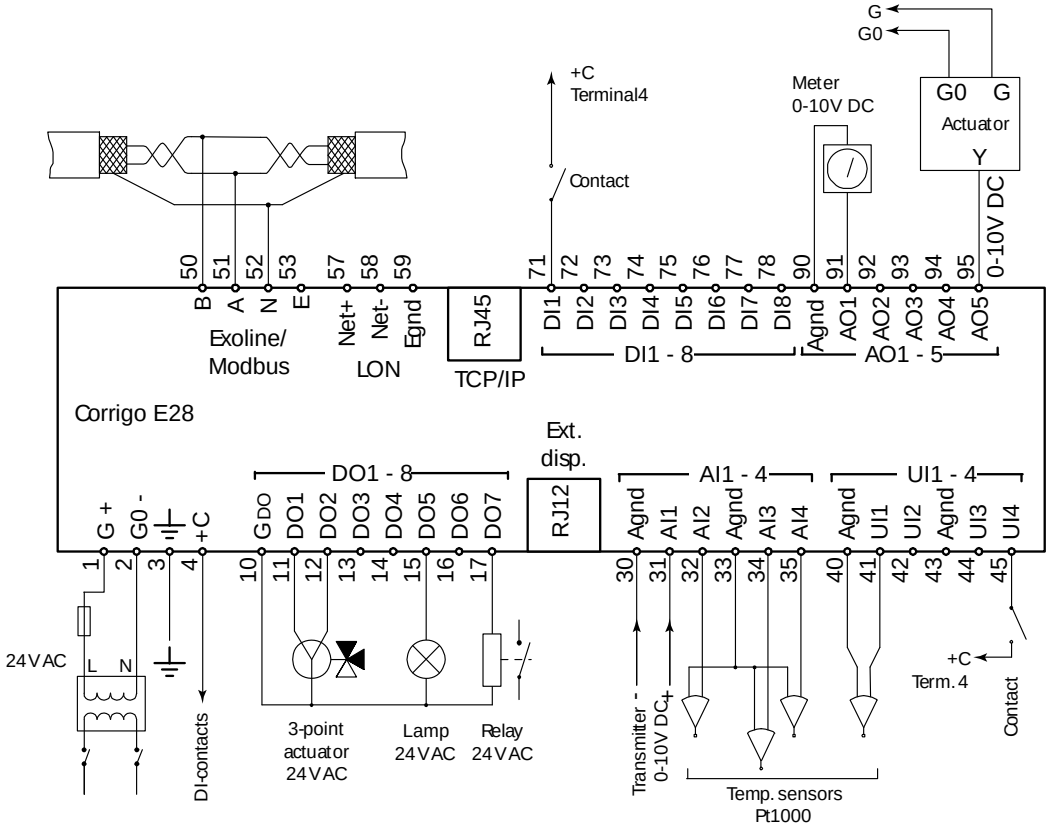
3.1 Installation

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

Ambient temperature: 0…50°C.

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

The picture below shows a wiring example for Corrigo E28.



3.2 Wiring

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

3.2.1 Supply voltage

24 V AC ±15%, 50…60 Hz or 20…36 V DC

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

3.2.2 Inputs and outputs

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

Analogue inputs

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

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

Digital inputs

Digital inputs must refer to C+ on terminal 4. Digital inputs may only be wired to voltage-free contacts. Any external voltage applied to a digital input may harm the unit.

Universal inputs

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

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

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

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

Analogue outputs

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

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

0…10 V DC

2…10 V DC

10…0 V DC

10…2 V DC

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

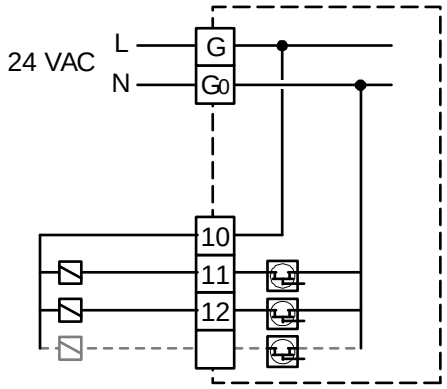
Digital outputs

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

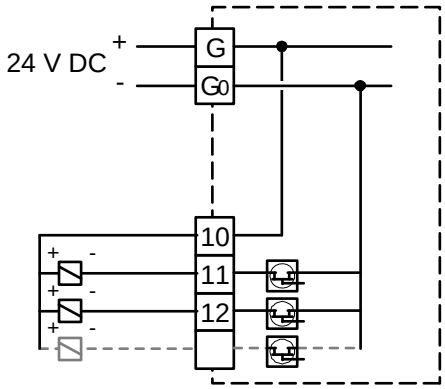
All the digital outputs are controlled by mosfet transistors. The outputs are internally connected with G_0 and can deliver max 2 A per output. However, the total power for all the DOs must not be over 8 A.

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

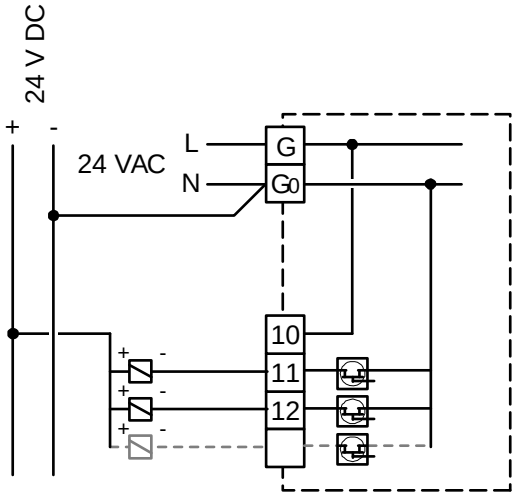
24 V AC supply and 24 V AC relays



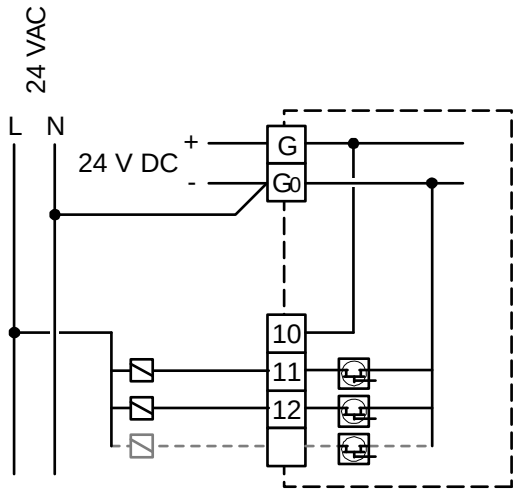
24 V DC supply and 24 V DC relays



24 V AC supply and 24 V DC relays



24 V DC supply and 24 V AC relays



3.2.3 Input and output lists

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

Analogue inputs

✓	Analogue input signal
	Outdoor temperature sensor
	Supply temperature, Heating system 1
	Supply temperature, Heating system 2
	Supply temperature, Heating system 3
	Supply temperature, Cooling system
	Domestic hot water circuit 1, supply temperature
	Domestic hot water circuit 2, supply temperature
	Storage tank supply temperature
	Room temperature, Heating system 1
	Room temperature, Heating system 2
	Room temperature, Heating system 3
	Room temperature, Cooling system PT1000
	Room temperature, Cooling system 0...10V
	Return temperature, Heating system 1
	Return temperature, Heating system 2
	Return temperature, Heating system 3
	Return temperature, Cooling system
	Return temperature, Hot water 1
	Storage tank return temperature
	Wind-speed transmitter, 0…10 V DC
	Differential pressure transmitter, 0…10 V DC
	Boiler temperature
	Boiler return temperature
	Humidity transmitter, 0...10V

✓	Analogue input signal
	Heating primary, Supply temperature
	Heating primary, Return temperature
	Cooling primary, Supply temperature
	Cooling primary, Return temperature

Digital inputs

✓	Digital input signal
	Run-indication/alarm circulation pump, P1A-HS1
	Run-indication/alarm circulation pump, P1B-HS1
	Run-indication/alarm circulation pump, P1A-HS2
	Run-indication/alarm circulation pump, P1B-HS2
	Run-indication/alarm circulation pump, P1A-HS3
	Run-indication/alarm circulation pump, P1B-HS3
	Run-indication/alarm circulation pump, P1A-CS1
	Run-indication/alarm circulation pump, P1B-CS1
	Run-indication/alarm circulation pump, P1-HWC1
	Run-indication/alarm storage tank charge pump, P1-HP
	Run-indication/alarm frequency converter for pressure control
	Pressure switch, expansion vessel
	External alarm
	Boiler alarm
	External power limitation
	Volume pulses, heating usage
	Energy pulses, heating usage meter
	Volume pulse, cold water usage 1
	Volume pulse, cold water usage 2
	Energy pulses, electricity meter
	CS1 Start

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

Analogue outputs

✓	Analogue output signal
	Valve actuator, Heating system 1, HS1
	Valve actuator, Heating system 2, HS2
	Valve actuator, Heating system 3, HS3
	Valve actuator, Cooling system 1, CS1

	Valve actuator, Hot water circuit 1, HW1
	Valve actuator, Hot water circuit 2, HW2
	Frequency converter, pressure control
	Split of any one of the above circuits

Digital outputs

✓	**Digital output signal**
	Start/stop pump, P1A-HS1
	Start/stop pump, P1B-HS1
	Start/stop pump, P1A-HS2
	Start/stop pump, P1B-HS2
	Start/stop pump, P1A-HS3
	Start/stop pump, P1B-HS3
	Start/stop pump, P1A, CS1
	Start/stop pump, P1B, CS1
	Start/stop pump, P1-HWC1
	Start/stop charge pump for storage tank, P1-HP1
	Start frequency converter for diff pressure control
	Start step 1, boiler
	Start step 2, boiler
	Sum alarm A + B
	Sum alarm A
	Sum alarm B
	Extra Timer channel 1
	Extra Timer channel 2
	Extra Timer channel 3
	Extra Timer channel 4
	Extra Timer channel 5
	Actuator HS1 increase
	Actuator HS1 decrease
	Actuator HS2 increase
	Actuator HS2 decrease
	Actuator HS3 increase
	Actuator HS3 decrease
	Actuator CS1 increase
	Actuator CS1 decrease
	Actuator HW1 increase
	Actuator HW1 decrease
	Actuator HW2 increase
	Actuator HW2 decrease
	Bypass valve, CS1

Wiring diagram Corrigo E28-S factory configuration

(See also the picture of the position of the terminals on page 10.)

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

10	G	Reference for digital outputs DO.
11	DO1	Start/stop pump, P1A-HS1
12	DO2	Start/stop pump, P1B-HS1
13	DO3	Actuator HS1 increase
14	DO4	Actuator HS1 decrease
15	DO5	Start/stop pump, P1-HWC1
16	DO6	Start/stop pump, P1A-HS2
17	DO7	Sum alarm A + B

30	Agnd	Reference pole for analogue inputs
31	AI1	Outdoor temperature
32	AI2	Supply, Heating system 1, HS1
33	Agnd	Reference pole for analogue inputs
34	AI3	Supply temp, hot water sequence 1, HW1
35	AI4	Return temperature, Heating system 1, HS1

40	Agnd	Reference pole for analogue inputs
41	UI1	Supply, Heating system 2, HS2
42	UI2	Return temperature, Heating system 2, HS2
43	Agnd	Reference pole for analogue inputs
44	UI3	Room temperature, Heating system 1, HS1
45	UI4	Room temperature, Heating system 2, HS2

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

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

71	DI1	Run-indication/alarm pump, P1A-HS1
72	DI2	Run-indication/alarm pump, P1B-HS1
73	DI3	Run-indication/alarm pump, P1A-HS2
74	DI4	Run-indication/alarm pump, P1-HWC1
75	DI5	Volume pulses, heating usage meter
76	DI6	Energy pulses, heating usage meter
77	DI7	Volume pulse, cold water usage 1
78	DI8	Pressure switch, expansion vessel

90	Agnd	Reference for analogue outputs AO
91	AO1	Valve Heating system 1, HS1
92	AO2	Actuator heating sequence 1, HW1"
93	AO3	Valve Heating system 2, HS2
94	AO4	
95	AO5	

Wiring diagram Corrigo E15-S factory configuration

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

10	G	Reference for digital outputs DO.
11	DO1	Start/stop pump, P1A-HS1
12	DO2	Start/stop pump, P1B-HS1
13	DO3	Start/stop pump, P1-HWC1
14	DO4	Sum alarm A + B

30	Agnd	Reference pole for analogue inputs
31	AI1	Outdoor temperature
32	AI2	Supply, Heating system 1, HS1
33	Agnd	Reference pole for analogue inputs
34	AI3	Supply temp, hot water sequence 1, HW1
35	AI4	Return temperature, Heating system 1, HS1

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

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

71	DI1	Run-indication/alarm pump, P1A-HS1
72	DI2	Run-indication/alarm pump, P1B-HS1
73	DI3	Run-indication/alarm pump, P1-HWC1
74	DI4	Pressure switch, expansion vessel

90	Agnd	Reference for analogue outputs AO
91	AO1	Valve Heating system 1, HS1
92	AO2	Actuator heating sequence 1, HW1"
93	AO3	Valve Heating system 2, HS2

Wiring diagram Corrigo E8-S factory configuration

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

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

10	G	Reference for digital outputs DO.
11	DO1	Start/stop pump, P1A-HS1
12	DO2	Start/stop pump, P1B-HS1

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

30	Agnd	Reference pole for analogue inputs
31	AI1	Outdoor temperature
32	AI2	Supply, Heating system 1, HS1

71	DI1	Run-indication/alarm pump, P1A-HS1
72	DI2	Run-indication/alarm pump, P1B-HS1
73	DI3	Pressure switch, expansion vessel

90	Agnd	Reference for analogue outputs AO
91	AO1	Valve Heating system 1, HS1

Empty wiring diagram Corrigo E28-S

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

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

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

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

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

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

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

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

Empty wiring diagram Corrigo E15-S

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

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

10	G	Reference for digital outputs DO.
11	DO1	
12	DO2	
13	DO3	
14	DO4	

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

71	DI1	
72	DI2	
73	DI3	
74	DI4	

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

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

Empty wiring diagram Corrigo E8-S

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

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

10	G	Reference for digital outputs DO.
11	DO1	
12	DO2	

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

30	Agnd	Reference pole for analogue inputs
31	AI1	
32	AI2	

71	DI1	
72	DI2	
73	DI3	

90	Agnd	Reference for analogue outputs AO
91	AO1	

Chapter 4 **Commissioning**

General

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

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

Corrigo E tool

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

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

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

4.1 How to do it

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

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

Option 1:

- Jump straight to chapter 6 and 7, *Display, LEDs and buttons* and *Access rights*.
- After mastering the button and menu system, connect power to your Corrigo, log on at System level and go to the menu Configuration.
- For the time being, skip the configuration menu Inputs/Outputs and start by configuring Control functions.
- Run through the configuration menus in order and set whatever functions and parameters you wish to include. Use chapter 5 of this manual for reference. Keep track of which inputs and outputs you will need. To help you, there is a list of input and output functions provided in chapter 3, (3.2.3 Input / Output list.)
- Finally, configure Inputs/Outputs.
- Exit Configuration and go to Settings
- Set the control values in Settings
- Set the clock and scheduler functions in Time Settings.
- Set the control setpoints in Actual/Setpoint.

Your Corrigo should now be ready to run.

Option 2:

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

Functional description

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

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

Display, buttons and LEDs

Read chapter 6 on how to use the front panel buttons to navigate the Corrigo E menu system.

Access rights

Chapter 7. Learn how to log on to the Corrigo E

Configuration

Chapter 8. Configuration.

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

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

Settings

Set the control parameters, P-band, I-time for the temperature control loops used in section 9.2 Control temp.

Set the alarm parameters; alarm levels and delay times in section 8.1 Alarm settings.

Clock

Section 9.5.

Set the clock and calendar functions.

Setpoints

Section 9.1.

Set all the setpoints for all active control loops.

Manual/Auto

Section 9.3.

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

Chapter 5 **Functional description**

5.1 Heating system

5.1.0 General

Corrigo E can be configured for 1 to 3 heating systems, HS1, HS2 and HS3.

5.1.1 Controllers

The heating system controllers are PI-controllers with settable P-band and I-time.

5.1.2 Control curves

The controllers have individual outdoor temperature / supply temperature control curves. Each curve has 8 fix points. The default setting of the outdoor temperature values for the fix points are -20, -15, -10, -5, ±0, +5, +10, +15. These can not be changed using the Corrigo front panel but can be changed using E tool. The corresponding supply temperature values are settable using the front panel or E tool.

5.1.3 Adaption of curves

Room sensors can be used to correct the control curves. The average room temperature error over 24 h is calculated. Values 1 hour before and 1 hour after a day/night or night/day change-over are ignored. The curves are corrected once daily using the average room temperature error and a settable correction factor. The correction will be a parallel displacement of the entire curve using the following formula.

Displacement = (Room setpoint - Average temp)*Factor

5.1.4 Temperature limits

The heating systems have individually settable min. and max. temperature limits on the supply and return. If the return temperature is not within the set limits, the supply temperature will be adjusted with a settable factor to eliminate the error. However, the supply setpoint will never fall below/exceed the set min./max. setpoint.

Primary and secondary return temperature limits

The primary return temperature must not be more than 3 degrees (settable) higher than the secondary return temperature. When the difference exceeds the set value, the control signal to the valve will be overridden to close the valve, i.e. decrease the flow, which will lower the return temperature.

Inputs and outputs

AI	Return temperature HS1 and/or HS2
AI	Return temperature Heating primary

5.1.5 Pump control

Each system can have single or double pumps. Double pumps are run one at a time with automatic, weekly change-over and automatic start of the backup pump on malfunction of the active pump.

Outdoor temperature dependent pump stop can be configured.

Pumps are exercised for 5 minutes at 3 pm daily.

5.1.6 Frost protection

If a controller is set to Off or Man(ual control) and the outdoor temperature is below a settable value, a minimum settable supply temperature will be maintained and the pump will run.

5.1.7 Wind compensation

To compensate for wind chilling, it is possible to connect a wind sensor and generate a setpoint displacement. The function has a settable displacement factor (°C per m/s).

5.1.8 Building inertia and boost

The building inertia in relation to the heat storage capacity of the building shell is settable to one of three levels: None, Medium, High.

The set inertia dictates the influence of outdoor temperature.

With no inertia, the outdoor temperature is used directly, with medium inertia a one-hour average is used and with high inertia a 12-hour average is used.

Boost: Boost is used to speed up the raising of the indoor temperature when switching from night set back temperature to normal comfort temperature. This is done by temporarily displacing the supply temperature set-point curve.

The following conditions must be met:

- Average outdoor temperature lower than 17°C
- Supply set-point value higher than 25°C
- Night set-back more than 2°C (room temperature)

The displacement is calculated as follows:

Displacem.=Factor*(17 - outdoor temp)*night set-back

Factor is settable 0…10 where 0 gives no boost and 10 gives high boost.

The time in minutes that boost will be active is calculated as follows:

Time = 1.6*(17 - Outdoor temp)

Time is limited to maximum 60 minutes.

5.1.9 Night set-back

Lowering of the night temperature is set in room temperature degrees. The corresponding lowering of the supply temperature is calculated by the controller by multiplying the value by 3. The Corrigo has individual schedules for each heating system with two comfort-temperature periods per day.

5.1.10 Start time optimisation

This function is used in order to reach the set room temperature when comfort time is activated after a period of night set-back. How far in advance the supply temperature is to be increased is calculated as below:

Optimisation time = (Setpoint Room - Actual value Room) / Heating capacity

The heating capacity has a minimum and a maximum value (factory setting minimum value: 0.02°C/min, maximum value: 0.1°C/min). The average of the min. and max. capacities is used as the start value for the function. Then the capacity is converted as below:

Heating capacity = (Heating capacity + Temperature boost / Optimisation time) / 2

Here, the temperature boost is equal to the difference in room temperature when the optimisation was stopped and when it was started.

Outdoor compensated start time optimisation

When outdoor compensation of the start time optimisation is active, the compensated capacity is calculated as below:

Outdoor compensated capacity = capacity * (1 + Outdoor compensation / 100 * Outdoor temperature diff)

The outdoor compensation is a settable percentage between 0...100% (0%=no compensation). The factory setting is 3%.

Outdoor temperature diff is the difference between the actual outdoor temperature and the outdoor temperature at the latest optimisation.

Inputs and outputs

AI	Room sensor

5.1.11 Power limitation

The digital input signal *External power limitation* can be used to temporarily restrict the power to the heating systems. When activated, the setpoints are lowered by a settable factor (% relative to 20°C). The limitation applies to all configured heating systems.

The limitation is calculated as below:

Limited setpoint=20+(Setpoint-20)*Factor/100

Factor 100 gives no setpoint reduction, 0 gives full reduction to 20°C.

5.2 Cooling system

5.2.1 General

From software version 3.0, a cooling system can be configured.

5.2.2 Controller

The cooling system is controlled by a PI-controller with settable P-band and I-time. The controller uses a temperature sensor input for supply temperature cooling circuit, and an analogue output for control valve cooling.

5.2.3 Dew point control

Dew point control is used in order to avoid condensation in the cooling pipe system, especially when chilled beams are connected. The function increases the supply temperature of the cooling circuit depending on the present dew point in the room. A combined humidity and temperature transmitter (e.g. Regin's HTRT) is connected and configured at the same time as the dew point function.

The dew point function calculates the actual dew point temperature and adds it to a settable setpoint displacement (factory setting 1°C). Then the sum is compared with the present setpoint. The highest value will be used as supply temperature setpoint for the cooling system.

5.2.4 Pump control

In the cooling system, a digital output can be used to control the pump. The pump can be configured to run continuously or with pump stops. Pump stops are activated via the outdoor temperature sensor or via the digital input ”CS1 Start”. During pump stops, the output to the actuator is 0V.

5.2.5 Eco/Comfort function

The Corrigo has a schedule for the cooling system with two comfort-temperature periods per day. When not in the comfort periods, a settable increase of the setpoint is added to the supply in order to reduce energy consumption.

5.2.6 Temperature limit

The supply temperature can be max. limited via a fixed settable value. It is also possible to min. and max. limit the return temperature. When the return temperature falls below the minimum limit or exceeds the maximum limit, the supply setpoint will be overridden with a settable factor.

5.2.7 Bypass valve (frost protection in the primary cooling system)

In the cooling system, a digital output can be used to control a bypass valve. The CS1-Bypass valve will open on condition that the outdoor temperature falls below 3°C and the CS1-Valve is closed (0 %). If one of these conditions is not met, the CS1-Bypass valve will be closed.

5.3 Domestic hot water

5.3.1 General

Corrigo E can be configured for one or two tap hot-water systems HW1 and HW2. These have constant supply-temperature control.

5.3.2 Controllers

The heating system controllers are PID-controllers with settable P-band, I-time and D-time.

5.3.3 Night set-back

The Corrigo E has individual schedules for each hot water system with two normal-temperature periods per day.

5.3.4 Pump control (HW1 only)

Corrigo E has a digital output signal that can be used to control the hot-water circulation pump in HW1. The pump will run according to the settings of the night set-back schedule, running during normal temperature periods and standing still during periods with reduced temperature.

5.3.5 Periodic overheating (HW1 only)

To prevent the growth of Legionella bacteria, the function periodic overheating can be activated. Overheating can take place once a day or once a week. The running time and start time are settable. When using a return temperature sensor, the function will be aborted when the temperature on the return exceeds 55°C. The minimum running time is 4 minutes.

5.4 Storage tank

A storage tank function can be enabled.

The storage tank load pump, P1-HP1 is started depending on the storage tank supply water and return water temperatures.

Loading is started if the return water temperature is lower than the set start temperature.

Loading is stopped when the supply temperature is higher than the set stop temperature and the return temperature is higher than the set start temperature + the set differential.

5.5 Pressure control

Corrigo E can, using an analogue output signal, control a variable speed pump to maintain a constant settable pressure.

A digital output signal is available to give a start signal to the frequency converter. This output is enabled as soon as the converter control signal rises above 0.1 V.

5.6 Boiler control

When boiler control is configured, the setpoint is either constant or dependent of the other configured heating circuits.

Constant setpoint

When using constant setpoint, it is possible to configure two start temperatures and two stop temperatures. Should the boiler temperature fall below Start temp1, the digital output signal Start1 will be activated. Should the temperature fall below Start temp2, Start2 will be activated. The digital outputs are set to off when the boiler temperature exceeds the set stop temperatures.

Circuit-dependent setpoint

Instead of using constant setpoint, you can use a setpoint that is dependent of:

- HS
- HS & HW
- HS & HP1
- or HS & HW & HP1.

For circuit-dependent setpoint, the start and stop temperatures have settable hystereses. The digital outputs Start1 and Start2 are set to on when the boiler temperature falls below the setpoint minus the hysteresis for Start1 and Start2 respectively. The outputs are set to off when the boiler temperature exceeds the setpoint plus the respective stop hysteresis.

5.7 Cold-water monitoring

One or two circuits monitoring the cold-water usage can be configured each using a digital pulse input from a water meter. The pulse constant is settable. Maximum pulse rate is 2 Hz.

5.7.1 Values

The following values are calculated

- 24 hour usage in litres, today
- 24 hour usage in litres, yesterday
- 24 hour usage in litres, day before yesterday
- Lowest hourly usage in litres, today
- Lowest hourly usage in litres, yesterday
- Total usage in m^3. The value can be reset.
- Water-flow (litres/min)

5.7.2 Alarms

Pulse error	If no pulses are detected within a settable time an alarm is activated. Setting the time to 0 inhibits the alarm function.
High usage	If the daily usage is higher than a settable value an alarm is activated.
Leakage control	If the lowest hourly usage during the previous day is higher than a settable value an alarm is activated.

5.8 Energy monitoring

One digital pulse function can be configured for heating energy monitoring. The pulse constant is settable.

5.8.1 Usage values

The following usage values are calculated:

- 24 hour usage in kWh, today
- 24 hour usage in kWh, yesterday
- 24 hour usage in kWh, day before yesterday
- Total usage in kWh or MWh. The value can be reset.

5.8.2 Power values

Heating power is calculated by measuring the time between the energy pulses. The following power values are calculated:

- Instantaneous value for a certain time or after a certain number of pulses.
- Average of the above instantaneous value for the last hour.
- Maximum value for the above instantaneous value.

5.8.3 Leakage monitoring

Once a week, the control valves will be closed and the energy usage measured for a preset time. An alarm is generated if the energy leakage is larger than a settable value, default 3000 W. The time for and duration of the leakage monitoring is settable. Default is Sundays at 2:00 am for 30 minutes.

5.8.4 Alarms

Pulse error	If no pulses are detected within a settable time an alarm is activated. Setting the time to 0 inhibits the alarm function.
High usage	If the daily usage is higher than a settable value an alarm is activated.

5.9 Electricity meter

One digital pulse function can be configured for heating energy monitoring. The pulse constant is settable.

5.9.1 Usage values

Total usage in MWh. The value can be reset.

5.10 Timer channel outputs

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

5.11 Alarms

5.11.1 Alarm handling

Alarms are indicated by the alarm LED on the front.

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

5.11.2 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 different priority levels. Using the front panel it is possible to change the alarm priority level (A-/B-/C-alarm/Not active) of any alarm.

5.11.3 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.

Chapter 6 **Display, LEDs and buttons**

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

6.1 Display

The display has 4 rows of 20 characters.

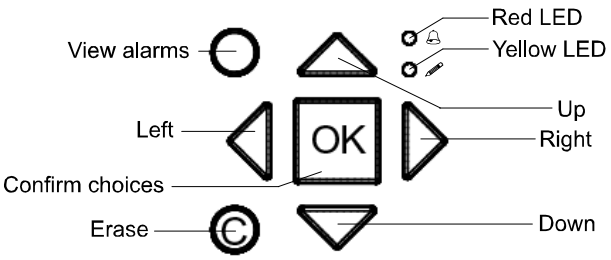
It has background illumination. The illumination is normally off, but is activated as soon as a button is pressed. The illumination will be turned off again after a period of inactivity.

6.2 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.

6.3 Buttons



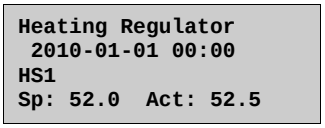
There are seven buttons: 4 arrow buttons which will be called UP, DOWN, RIGHT and LEFT. The menus in the Corrigo E are organized in a horizontal tree structure. The UP / DOWN-buttons are used to move between menus at the present menu level. The RIGHT / LEFT buttons are used to move between menu levels.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

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

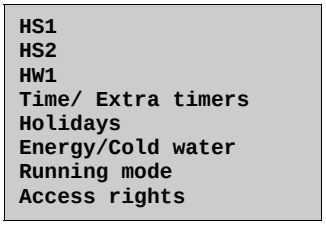
6.4 Navigating the menus

From version 3.0, significant changes have been made to the Corrigo menu system in order to make it more structured and user-friendly. Which of the menus are shown depends on the choice of access level/user access and the configured inputs/outputs.

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. With normal access and standard configuration, the following menu is shown:



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

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

Change parameters

In some menus there are parameters that can be set. This will be indicated by the “write enable” LED 🖉 flashing. To change a parameter, first press the OK button. A cursor will appear at the first settable value. If you wish to change the value, do so by pressing the UP / DOWN buttons.

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

When the desired value is displayed press OK.

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

To pass a value without changing it, press RIGHT.

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

Chapter 7 **Access rights**

There are 3 different log on levels, System level which has the highest authority, Operator level and the basic “no-log on” level. System level gives full read / write access to all settings and parameters in all menus. Operator gives you read and write access to all settings and parameters in all menus except *Configuration.* The basic level gives read-only access to all parameters and settings except *Configuration*.

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

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

7.1 Log on

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

In this menu it is possible to log on to any level by entering the appropriate 4-digit code. The log on menu will also be displayed should you try to gain access to a menu or try to do an operation requiring higher authority than you have.

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

7.2 Log off

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

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

Logoff is also initiated automatically 5 minutes after the last time a button is pressed.

It is possible to remove the automatic logoff, see 7.5 below.

7.3 Change password

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

System	1111
Operator	3333
Basic	5555

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

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

7.4 Forgotten your password?

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

7.5 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 8 **Configuration**

Start by logging on at System level. See chapter 7.

Using DOWN, set the display marker opposite the menu-title **Configuration** and press RIGHT.

The main configuration menu will be shown.

```
Alarm settings
Inputs/Outputs
Supply
Optimizer
DewPoint Temp.
Return temp.
Pump stop
Twin/Single pump
Run ind/Motor prot
Actuator type
Actuator run time
Actuator exercise
Leakage monitoring
Pulse inputs
Communication
Other params
System
```

8.1 Alarm settings

```
Alarm limits       →
Alarm delay  →
```

8.1.1 Alarm limits

Control deviation HS1, HS2 and HS3

```
Control deviation
HS1:  20.0  °C
HS2:  20.0  °C
HS3:  20.0  °C
```

Control deviation CS1, HW1 and HW2

```
Control deviation
CS1:  20.0  °C
HW1:  20.0  °C
HW2:  20.0  °C
```

Scalding limit HW1 and HW2

```
Scalding
HW1: 65.0  °C
HW2: 65.0  °C
```

Low return temperature

```
Low return temp.
HWC1: 10  °C
```

Boiler limits

```
High boiler temp
 70.0   °C
Low boiler temp
 30.0   °C
```

High water usage

```
High 24h water usage
10000.0 liters
High 1h water usage
10000.0 liters
```

High energy usage

```
High 24h energy
usage
10000.0 kWh
```

Maximum time between pulses

```
Max between Vpulse
 0    min
Max between Epulse
 0    min
```

```
Max between CW1pulse
 0    min
Max between CW2pulse
 0    min
```

Maximum permitted leakage

```
Permitted leakage
3.00 kw
```

8.1.2 Alarm delays

Control deviation HS1, HS2 and HS3

```
Control deviation
HS1: 60  min
HS2: 60  min
HS3: 60  min
```

Control deviation CS1, HW1 and HW2

```
Control deviation
CS1:   0 min
HW1:  60 min
HW2:  60 min
```

Scalding limit

```
Scalding
HW1: 300  sec
HW2: 300  sec
```

Low return temperature

```
Low return temp.
HWC1: 20  sec
```

Boiler limits

```
High boiler temp
 0     sec
Low boiler temp
 0     sec
```

Expansion vessel / External alarm

```
Expansion vessel
 60   sec
External Alarm 1
  0   sec
```

8.2 Inputs and outputs

```
Ai
Di
Ui
Ao
Do
```

General

Free configuration

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

Delivery setting

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

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

8.2.1 Analogue inputs AI

```
Ai1
Sign: Outdoor temp
Raw value: 22.3
Compensation:0.0°C
```

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

Input signals can be compensated for example for wiring resistance.

The raw value will show the actual, uncompensated input value.

The following submenu can be found at the end:

```
Pressure at
 0V: 0.0  kPa
10V: 10.0 kPa
Filter factor: 0.2
```

8.2.2 Digital inputs DI

```
Di1
NO/NC: NO Signal:
HS1-PumpA
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.

8.2.3 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: HS2 Supply
DI sign: Not active
```

After choosing AI or DI signal (the unused alternative must be set to *not active*) there is a sub-menu with settings used when the input is configured as an AI-input. This menu is accessed by pressing RIGHT.

```
UAI1
Sign: HS2 Supply
Raw value: 38.5
Compensation: 0.0°C
```

Input signals can be compensated for example for wiring resistance.

The raw value will show the actual, uncompensated input value.

If the input is configured as a digital input, there is a submenu which is accessed by pressing RIGHT:

```
UDI1
NO/NC: NO Signal:
HS2-PumpA
Status: Off
```

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

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

8.2.4 Analogue outputs

Analogue outputs are 0…10 V DC.

```
Ao1
Sign: HS1 Actuator
Auto
Value: 2.3 V
```

By pressing the OK-button three times (until Auto is blinking) you can set the output to Auto, Manual or Off. In Auto mode the output is controlled by the Corrigo, in Manual mode the output can be controlled manually by pressing DOWN until reaching Value and setting the output to 0....10V. In Off mode the output signal is always 0V.

8.2.5 Digital outputs

```
Do1
Signal: HS1-PumpA
Auto
Status: On
```

Digital outputs can be set to one of three modes: Auto, Manual Off or Manual On.

8.3 Supply

```
Parallel displace.
Maximum limit
Minimum limit
Auto-correct. Setp
Wind compensation
```

8.3.1 Parallel displacement

To each of the set control curves can be added a parallel displacement.

```
Parallel displace.
HS1: 0.0   °C
HS2: 0.0   °C
HS3: 0.0   °C
```

8.3.2 Maximum limit

A maximum supply temperature can be set individually for each system.

```
Maximum limit
HS1: 1000°C
HS2: 1000°C
HS3: 1000°C
CS1: 1000°C
```

8.3.3 Minimum limit

A minimum supply temperature can be set individually for each system.

```
Minimum limit
HS1: 0   °C
HS2: 0   °C
HS3: 0   °C
```

8.3.4 Auto-correction of setpoint

Room sensors can be used to correct the control curves. The average room temperature error over 24 h is calculated. Values 1 hour before and 1 hour after a day/night or night/day change-over are ignored. The curves are corrected once daily using the average room temperature error and a settable correction factor. The correction will be a parallel displacement of the entire curve using the following formula.

Displacement = (Room setpoint - Average temp)*Factor

```
Auto-correction
Setpoint HS1
On              →
```

```
Corr. factor HS1
 2.0
Present correction
 0.6°C
```

8.4 Optimisation

When comfort control is activated after a period of economy mode, the optimizer function is utilised in order to reach comfort temperature. For more information, see section 5.1.10.

```
Optimizer function
Min capacity
Max capacity
Outdoor comp. fact.
```

8.4.1 Optimizer function

Activation or deactivation of the function.

```
Optimizer function
HS1: No
HS2: No
HS3: No
```

8.4.2 Minimum capacity

Setting of the min. value of the capacity variable.

```
Min capacity
HS1: 0.02 °C/min
HS2: 0.02 °C/min
HS3: 0.02 °C/min
```

8.4.3 Maximum capacity

Setting of the max. value of the capacity variable.

```
Max capacity
HS1: 0.10 °C/min
HS2: 0.10 °C/min
HS3: 0.10 °C/min
```

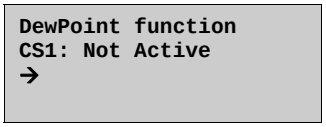
8.4.4 Outdoor compensation factor

Setting of the outdoor temperature effect on the function.

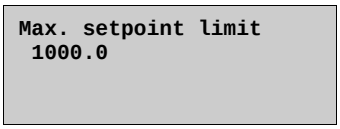
```
Outdoor comp. fact.
HS1: 3.0  %
HS2: 3.0  %
HS3: 3.0  %
```

8.5 Dew point control

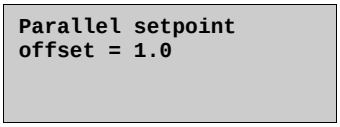
The dew point function is used to calculate the dew point temperature, taking into consideration the room temperature (the cooling system) and the relative air humidity. The calculated dew point temperature is added to the setpoint displacement (factory setting 1°C) and is then compared with the present setpoint value. The highest value of the two is used as the present cooling setpoint. To avoid having to use the complete processor power to calculate the dew point temperature, there is a hysteresis for the temperature (0.1°C) and the relative humidity (1%), which means that the present dew point temperature will be updated in small steps.



Submenus when using dew point control:



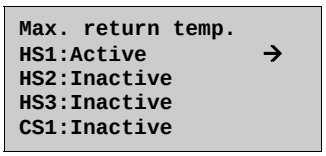
The setpoint displacement is added to the calculated dew point.

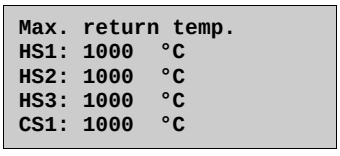


8.6 Return temperature limits

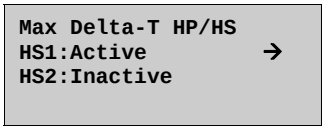
Individual maximum and minimum temperature limits can be set for the different temperature systems. If the return temperature is not within the set limits, the supply temperature will be adjusted to eliminate the error. The adjustment will be the temperature offset multiplied by the set limiting factor.

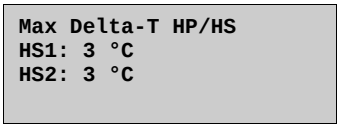
8.6.1 Maximum temperature, return





8.6.2 Max Delta-T HP/HS





8.6.3 Minimum temperature, return

```
Min. return temp.
HS1:Active         →
HS2:Inactive
HS3:Inactive
CS1:Inactive
```

```
Min. return temp.
HS1: 0   °C
HS2: 0   °C
HS3: 0   °C
CS1: 0   °C
```

8.6.4 Limiting factor, return limitation

```
Return limit factor
HS1: 1.00
HS2: 1.00
HS3: 1.00
CS1: 1.00
```

8.7 Pump stop

Each heating system has individual day and night stop temperatures. If the outdoor temperature exceeds the set stop value, the circulation pump will stop and the output to the valve actuator is set to 0. The pump will start if the temperature falls below the set stop temperature by more than the set hysteresis and the heating output can also be activated if heating is required. Night is between 00:00 am and 05:00 am.

All pumps, even resting twin-pumps, are exercised once daily for 5 minutes at 3 pm.

```
Pump stop HS1:On
Temp stop day: 17°C
Temp stop night 17°C
Hysteresis: 2.0°C
```

The cooling system also has individual stop temperatures. If the outdoor temperature falls below the set stop value, the pump will stop and the output to the valve actuator is set to 0. The pump will start again when the temperature exceeds the stop temperature plus the hysteresis.

As an alternative to outdoor temperature dependent pump stop, the digital input ”CS1 start” can be used for stopping/starting the pump. The output to the valve actuator will then be forced to 0V. If CS1 start has been configured, this input must be active (1) for the pump to be allowed to start again.

```
Pump stop CS1:On
Temp stop day: 15°C
Temp stop night 15°C
Hysteresis: 2.0°C
```

The domestic hot water system HW1 does not have any temperatures for pump stop, but follows the timer output instead. HWC1 stops when the timer output for comfort temperature is not active and the output signal to the analogue output HW1 is 0V. The pump will start again when either the comfort period is activated or when the output to HW1 exceeds 0.1V.

```
Pump stop HW1:Off
```

Daily pump exercise of the heating systems and the cooling system takes place daily at 15:00 (settable).

```
Hour for exercise
HS1: 15 h
HS2: 15 h
HS3: 15 h
```

```
Hour for exercise
CS1: 15 h
```

8.8 Twin/Single pump

Each system can be configured for either a single pump or twin pumps.

When twin pumps are configured, the pumps are alternated weekly on Tuesdays at 10:00 am. On activation of the pump alarm for the active pump the Corrigo will automatically switch to the other pump.

```
Twin/Single pump
HS1: Twin pumps
HS2: Single pump
HS3: Single pump
```

```
Twin/Single pump
CS1: Single pump
```

8.9 Run indication/Motor protection

Digital inputs can be used either for indication of the motor running or for monitoring of motor protection contacts for pumps. The inputs can be normally open (NO) or normally closed (NC) (see section 8.2.2 Digital inputs). When the pump is configured to run-indication, the input should be NO and, consequently, the digital input should be on when the pump is running and off when the pump is at a standstill. An alarm is generated if this is not the case for longer than the set alarm delay for the pump in question.

If the pump is configured to motor protection and the input is set to NO, a pump alarm is generated when the input is on. If the input is NC, the pump alarm will be generated if the input is off.

```
Run ind/Motor prot
HS1: Motor prot
HS2: Motor prot
HS3: Motor protection
```

```
Run ind/Motor prot
CS1: Motor protection
```

```
Run ind/Motor prot
  HWC1: Motor prot
  HP1: Motor prot
Freq.Con: Motor
protection
```

8.10 Actuator type

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

```
Actuator type
HS1: 0-10V
HS2: 0-10V
HS3: 0-10V
```

```
Actuator type
CS1: 0-10V
```

```
Actuator type
  HW1: 0-10V
  HW2: 0-10V
Freq.: 0-10V
```

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

8.11 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.

```
Actuator run time
HS1: 120 sec
HS2: 120 sec
HS3: 120 sec
```

```
Actuator run time
CS1: 120 sec
HW1: 80 sec
HW2: 80 sec
```

8.12 Valve exercising

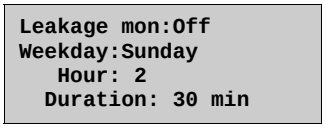
The valves and actuators for the cooling and heating systems can be exercised daily. Default time is 02:00:00 but can be set to any time. The actuators will be forced to open position for the set time (factory setting 15 seconds, can be changed via E tool). The pumps will run and the temperature offset alarm will be blocked for the duration of the exercising.

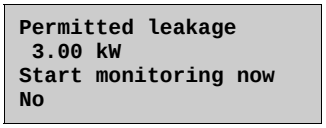
```
Actuator exercise
HS1: Off     Time: 15 s
Day: Every day
Hour: 2      Min.: 0
```

```
Actuator exercise
CS1: Off     Time: 15 s
Day: Every day
Hour: 2      Min.: 0
```

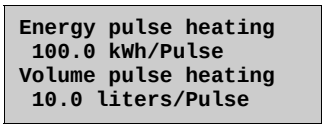
8.13 Leakage monitoring

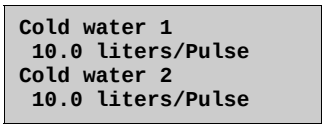
Once a week, the control valves will be closed and the energy usage measured for a preset time. An alarm is generated if the energy leakage is larger than a settable value, default 3000 W. The time for and duration of the leakage monitoring is settable. Default is Sundays at 2:00 am for 30 minutes.

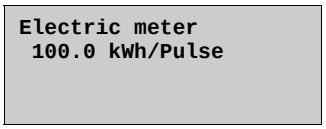




8.14 Pulse inputs



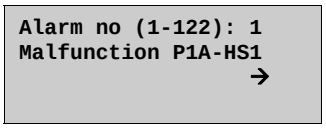


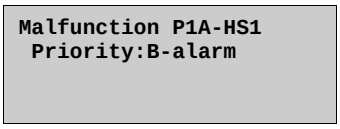


8.15 Alarm configuration

Permits configuration of all alarms.

Select the appropriate alarm number (from the alarm list). The alarm text for the alarm will be displayed and the alarm priority can be set: A-alarm, B-alarm, C-alarm, D-alarm or not active.





Alarm text

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

Alarm list

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

	Alarm text	Pri	Description
1	Malf. P1A-HS1	B	Malfunction pump P1A-HS1
2	Malf. P1B-HS1	B	Malfunction pump P1B-HS1
3	Malf. P1A-HS2	B	Malfunction pump P1A-HS2
4	Malf. P1B-HS2	B	Malfunction pump P1B-HS2
5	Malf. P1A-HS3	B	Malfunction pump P1A-HS3
6	Malf. P1B-HS3	B	Malfunction pump P1B-HS3
7	Malf. P1-HWC1	B	Malfunction pump P1-HWC1
8	Malf. P1-VVB	B	Malfunction pump P1-VVB
9	Malfunction frequency converter	B	Malfunction frequency converter
10	Expansion vessel	A	Malfunction expansion vessel
11	External alarm	A	External alarm 1
12	Boiler alarm	A	Boiler alarm
13	Deviation HS1	A	Supply temp. HS1 deviates too much from the setpoint for too long
14	Deviation HS2	A	Supply temp. HS2 deviates too much from the setpoint for too long
15	Deviation HS2	A	Supply temp. HS2 deviates too much from the setpoint for too long
16	Deviation HW1	A	Supply temp. HW1 deviates too much from the setpoint for too long
17	Deviation HW2	A	Supply temp. HW2 deviates too much from the setpoint for too long
18	Sensor error Outdoor temp	B	Sensor error Outdoor temp
19	High HW1 temp	B	HW1 supply temperature too high
20	High HW2 temp	B	HW2 supply temperature too high
21	High Boiler temp	A	Boiler temperature too high
22	Low Boiler temp	A	Boiler temperature too low
23	Pulse error volume	B	No pulses from water volume meter
24	Pulse error energy	B	No pulses from energy meter
25	High cold water usage/day	B	24 hour cold water usage higher than limit
26	High energy usage	B	24 hour energy usage higher than limit
27	High cold water usage/hour	B	Cold water usage/hour higher than min. limit
28	High leakage	B	Leakage higher than set value
29	Malfunction P1A&B-HS1	A	Malfunction both circulation pumps P1A and P1B in HS1
30	Malfunction P1A&B-HS2	A	Malfunction both circulation pumps P1A and P1B in HS2
31	Malfunction P1A&B-HS3	A	Malfunction both circulation pumps P1A and P1B in HS3
32	Pulse error CW1	B	No pulses from cold water meter 1
33	Pulse error CW2	B	No pulses from cold water meter 2
34	HS1 manual	C	HS1 in manual running mode

	Alarm text	Pri	Description
35	HS2 manual	C	HS2 in manual running mode
36	HS3 manual	C	HS3 in manual running mode
37	HW1 manual	C	HW1 in manual running mode
38	HW2 manual	C	HW2 in manual running mode
39	Pressure manual	C	Pressure control in manual running mode
40	Boiler manual	C	Boiler in manual running mode
41	P1A-HS1 manual	C	P1A-HS1 in manual running mode
42	P1B-HS1 manual	C	P1B-HS1 in manual running mode
43	P1A-HS2 manual	C	P1A-HS2 in manual running mode
44	P1B-HS2 manual	C	P1B-HS2 in manual running mode
45	P1A-HS3 manual	C	P1A-HS3 in manual running mode
46	P1B-HS3 manual	C	P1B-HS3 in manual running mode
47	P1-HWC1 manual	C	P1-HWC1 in manual running mode
48	P1-HP1 manual	C	P1-HP1 in manual running mode
49	P1-Freq. manual	C	P1-frequency controlled in manual running mode
50	HS1 Supply Max	-	HS1 supply temp. max. limitation activated
51	HS2 Supply Max	-	HS2 supply temp. max. limitation activated
52	HS3 Supply Max	-	HS3 supply temp. max. limitation activated
53	HS1 Supply Min	-	HS1 supply temp. min. limitation activated
54	HS2 Supply Min	-	HS2 supply temp. min. limitation activated
55	HS3 Supply Min	-	HS3 supply temp. min. limitation activated
56	HS1 Return Max	-	HS1 return temp. max. limitation activated
57	HS2 Return Max	-	HS2 return temp. max. limitation activated
58	HS3 Return Max	-	HS3 return temp. max. limitation activated
59	HS1 Return Min	-	HS1 return temp. min. limitation activated
60	HS2 Return Min	-	HS2 return temp. min. limitation activated
61	HS3 Return Min	-	HS3 return temp. min. limitation activated
62	HS1 Frost	B	HS1 frost protection active
63	HS2 Frost	B	HS2 frost protection active
64	HS3 Frost	B	HS3 frost protection active
65	Internal battery error	B	Internal battery needs replacing
66	Low Boiler return temp	C	Return temperature from Boiler is too low
67	Sensor error HS1 Supply	B	Power failure or short-circuit sensor HS1 supply
68	Sensor error HS2 Supply	B	Power failure or short-circuit sensor HS2 supply
69	Sensor error HS3 Supply	B	Power failure or short-circuit sensor HS3 supply
70	Sensor error HW1 Supply	B	Power failure or short-circuit sensor HW1 supply
71	Sensor error HW2 Supply	B	Power failure or short-circuit sensor HW2 supply
72	Sensor error HP1 Supply	B	Power failure or short-circuit sensor HP1 supply
73	Sensor error HS1 Room	B	Power failure or short-circuit sensor HS1 room

	Alarm text	Pri	Description
74	Sensor error HS2 Room	B	Power failure or short-circuit sensor HS2 room
75	Sensor error HS3 Room	B	Power failure or short-circuit sensor HS3 room
76	Sensor error HS1 Return	B	Power failure or short-circuit sensor HS1 return
77	Sensor error HS2 Return	B	Power failure or short-circuit sensor HS2 return
78	Sensor error HS3 Return	B	Power failure or short-circuit sensor HS3 return
79	Sensor error HP1 Return	B	Power failure or short-circuit sensor HP1 return
80	Sensor error Wind	B	Incorrect signal Wind-speed transmitter
81	Sensor error Pressure	B	Incorrect signal Pressure transmitter
82	Sensor error Boiler temp	B	Power failure or short-circuit sensor Boiler supply
83	Sensor error Boiler	B	Power failure or short-circuit sensor Boiler return
84	Sensor error CS1 Supply	B	Power failure or short-circuit sensor CS1 supply
85	Sensor error CS1 Return	B	Power failure or short-circuit sensor CS1 return
86	Sensor error HP Supply	B	Power failure or short-circuit sensor HP supply
87	Sensor error HP Return	B	Power failure or short-circuit sensor HP return
88	Sensor error CP Supply	B	Power failure or short-circuit sensor CP supply
89	Sensor error CP Return	B	Power failure or short-circuit sensor CP return
106	Control deviation KS1	B	Supply temp. CS1 deviates too much from the setpoint for too long
107	CS1 in manual mode	B	CS1 in manual running mode
108	CS1 Supply Max	B	CS1 supply temp. max. limitation activated
109	CS1 Supply Min	B	CS1 supply temp. min. limitation activated
110	CS1 Return Max	B	CS1 return temp. max. limitation activated
111	CS1 Return Min	B	CS1 return temp. min. limitation activated
112	Malfunction P1A-KS1	B	Malfunction pump P1A-CS1
113	Malfunction P1B-KS1	B	Malfunction pump P1B-CS1
114	Malfunction P1A&B-CS1	B	Malfunction both circulation pumps P1A and P1B in CS1
115	P1A-CS1 in manual mode	B	P1A-CS1 in manual running mode
116	P1B-CS1 in manual mode	B	P1B-CS1 in manual running mode
117	Communication error Expansion unit 1	B	Communication fault between expansion unit 1 and the master controller
118	Communication error Expansion unit 1	B	Communication fault between expansion unit 2 and the master controller
119	Communication error M-bus DHM 1	B	M-Bus communication fault between master and district heating meter

	Alarm text	Pri	Description
120	Communication error M-bus WM 1	B	M-Bus communication fault between master and heat meter 1
121	Communication error M-bus WM 1	B	M-Bus communication fault between master and heat meter 2
122	Low return temp. HWC1	B	Return temperature too low for too long

8.16 Communication

8.16.1 Modbus communication

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

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

If Modbus communication is active, you can make settings by pressing RIGHT.

```
Modbus Address: 1
Speed:9600 bps
Two stop bits: Yes
Parity: None
```

8.16.2 Function Port 2

There are four possible settings of port 2: Slave, Expansion unit, Master or M-Bus. Port 2 is always used for communication with expansion units and meters. The function requires a 2-port Corrigo.

Slave

For connection to E tool.

```
Function Port 2
Slave
```

Expansion unit

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

```
Function Port 2
Expansion unit
```

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

To initiate the expanded controllers, you 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 Corrigo generation 2 (-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 controllers' inputs/outputs are named Exp1/Exp2). See section 10.3.2 for wiring.

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

Master

For future use.

```
Function Port 2
Master
```

M-Bus

If you want to connect a meter for district heating and/or one or two water meters to a Corrigo, the external hardware X1176 is required between the Corrigo and the meters. Communication from the meters takes place via M-Bus and X1176 converts M-Bus to EXOline in order for the Corrigo to handle the measured values. See section 10.3.1 for wiring.

```
Function Port 2
M-bus
```

Submenu:

```
District Heat Meter
Water meter 1
Water meter 2
```

As type of district heating meter and water meter, you can choose between Standard 1, ABB, EEM-C (Kamstrup), Standard 2, Scylar, Colorius MKI, Colorium MKII, CALEC-MB and Multitelegram.

```
District Heat Meter
Type: Disabled
Address  : 1
Interval : 15 min
```

```
Water meter 1
Type: Disabled
Address  : 2
Interval : 15 min
```

```
Water meter 2
Type: Disabled
Address  : 3
Interval : 15 min
```

8.16.3 Dial-up modem

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

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

8.16.4 Alarm forwarding via sms

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

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

8.17 Other parameters

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

8.17.1 Building inertia and boost

For detailed information, see 5.1.7 Building inertia and boost.

The building inertia is settable to one of three levels: None, Medium or High.

Boost:

Displacem.=Factor*(17 - outd. temp)*night set-back

Factor is settable 0…10 where 0 gives no boost and 10 gives high boost.

The time in minutes that boost will be active is calculated as follows:

Time = 1.6*(17 - Outdoor temp)

Time is limited to maximum 60 minutes.

```
Building inertia
None
Boost factor (0-10)
0
```

8.17.2 Power limitation

The digital input signal *External power limitation* can be used to temporarily restrict the power to the heating systems. When activated, the setpoints are lowered by a settable factor (% relative to 20°C). The limitation applies to all configured heating systems. The limitation is calculated as below:

Limited setpoint=20+(Setpoint-20)*Factor/100

```
Power limitation
 100% rel +20°C
```

Factor 100 gives no setpoint reduction, 0 gives full reduction to 20°C.

8.17.3 Frost protection

If a controller is set to Off or Man(ual control) and the outdoor temperature is below a settable value, a minimum settable supply temperature will be maintained and the pump will run.

```
Frost protect.:Off
Outdoor temp activ.
Frost prot: 0.0°C
Min sup.temp: 10.0°C
```

8.17.4 Split of output signal

Any one of the temperature control output signals HS1, HS2, HS3, CS1, HWC1 or HWC2 can be split in two.

```
Split of any
temp sequence:
No split
```

8.17.4 Periodic heating

For activation of periodic heating of either HWC1 or HP1. The function is used to prevent the growth of Legionella bacteria. Overheating can take place once a day or once a week. The running time and start time are settable. The function can be aborted if the return temperature exceeds 55°C. The minimum running time is 4 minutes.

```
Periodical heating
HW1: No
Day: Every day
Hour: 2    SetP: 62.0°C
```

8.17.4 Setpoint Boiler

For setting of the setpoint type for the boiler. The setpoint is either constant or dependent of:

- HS1-3
- HS1-3 & HW
- HS1-3 & HP1
- or HS1-3 & HW & HP1.

```
Boiler setpoint
Constant
```

With low return temperatures, the output to the heating systems is blocked.

```
Low return temp
boiler for blocking
valves: 30 °C
Hyst.: 5  °C
```

Resets the running times. Is automatically set to ”No” after reset.

```
Reset the run time
counter
Boiler step 1: No
Boiler step 2: No
```

Resets the number of starts. Is automatically set to ”No” after reset.

```
Reset the number
of start counter
Boiler step 1: No
Boiler step 2: No
```

8.18 System

8.18.1 Change language

Use this menu to change the display language.

```
Choose Language
English
```

Note: This menu is also directly accessible by holding the OK-button depressed during power-up or by pressing RIGHT three times when the start display is shown.

8.18.2 Choose start screen, the text normally shown on the display

There are 4 different to choose from.

Type 1

The second line shows date and time.

The third line shows the text HS1.

The fourth line shows the present temperature setpoint and actual values for HS1.

```
Heating Regulator
 04:09:15 11:28
HS1
Setp:32.8°C Act.:33.1°C
```

Type 2

The second line shows date and time.

The third line shows the text HWC1.

The fourth line shows the present temperature setpoint and actual values for HWC1.

```
Heating Regulator
 04:09:15 11:28
HW1
Setp:55.0°C Act.:54.8°C
```

Type 3

The second line shows the text HS1/HW1.

The third line shows the present setpoint and temperature for HS1.

The fourth line shows the present temperature setpoint and actual values for HWC1.

```
Heating Regulator
HS1/HW1
SP: 45.5°C Act.: 43.8°C
Sp:55.0°C Act:54.8°C
```

Type 4

The second line shows the present outdoor temperature.

The third line shows the text HS1.

The fourth line shows the present temperature setpoint and actual values for HS1.

```
Heating Regulator
Outdoor temp: 8.2°C
HS1
Sp:32.8°C Act:33.1°C
```

Type 5

The second line shows date and time.

The third line shows the text CS1.

The fourth line shows the present temperature setpoint and actual values for CS1.

```
Heating Regulator
 04:09:15 11:28
CS1
Sp:13.0°C Act:12.5°C
```

8.18.3 Automatic summertime adjustment

The internal clock is normally configured for automatic summertime/wintertime adjustment. The function can be disabled in this menu. When enabled, the clock will be advanced one hour at 02:00 am the last Sunday of March and retarded one hour at 03:00 am the last Sunday of October.

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

8.18.4 Address

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

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

8.18.5 Display anywhere (Remote control)

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

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

8.18.6 Automatic logoff

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

The automatic logoff can be removed, see 7.5.

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

Chapter 9 **Settings**

When you go to one of the control systems, four submenus will be shown, with the exception of Boiler and HP1 which only have two submenus (Actual/Setpoint and Manual/Auto).

Which of the following systems are accessible depends on the configured inputs/outputs.

For more information about access rights and configuration, see chapters 7 and 8.

```
HS1
HS2
HS3
CS1
HW1
HW2
HP1
Boiler
Time/Extra timers
Holidays
Energy/Cold water
Running mode
Configuration
Access rights
```

Submenus:

Actual/Setpoint: For setting of setpoint values and the slope of curves as well as reading of the actual temperature.

Control temp: For setting of the control parameters.

Manual/Auto: For manual setting of pumps and valves or reading of the present output.

Economy/Comfort: For setting of periods when you want comfort heating or comfort cooling.

```
Actual/Setpoint
Control temp
Manual/Auto
ECO/Comf. mode
```

9.1 Actual/Setpoint

9.1.1 HS1, HS2 and HS3

```
Outdoor temp:    -5  °C
HS1
Act.: 49.8 °C  Setp→
Setp: 55.0 °C
```

Submenu: Setting of supply temperatures that should correspond to set outdoor temperatures. For each system there are 8 settable breakpoints.

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 14°C for every 5 °C lowering of the outdoor temperature. So the setpoint at –23°C would be 77+3/5 * 14°C = 85.4°C.

Only the supply temperature values can be changed in the Corrigo. The outdoor temperature values can be changed using E tool.

```
Outd. comp. setp.HS1
-20 °C = 67 °C
-15 °C = 63 °C
-10 °C = 59 °C
```

```
Outd. comp. setp.HS1
 -5 °C = 55 °C
  0 °C = 53 °C
  5 °C = 43 °C
```

```
Outd. comp. setp.HS1
 10°C = 35 °C
 15°C = 25 °C
```

Submenu: Room sensor

Setting of the room setpoint. This menu is only active when a room sensor is configured.

```
Room sensor HS1
      Actual: 20.8 °C
     Setpoint: 21.0 °C
```

Submenu: Return temperature

```
Return temp.
HS1: 28.0 °C
```

9.1.2 CS1

The cooling system has a fixed setpoint value.

```
CS1
Act.: 13.0 °C
Setp:13.0 °C
```

Submenu: Room sensor

The room sensor for CS1 can either be a PT1000 or a 0...10V transmitter. When using a temperature transmitter, it must have a working range of 0...50°C. The room sensor does not influence the temperature control directly, however may affect it when using dew point control.

```
Room sensor CS1
Actual: 23.1 °C
```

Submenu: Return temperature

```
Return temp.
CS1: 14.0 °C
```

Submenu: Relative humidity

The humidity transmitter must have a working range that corresponds to the 0…100% RH of the Corrigo.

```
Relative Humidity
CS1: 43    %
```

9.1.3 HW1 and HW2

Actual/setpoint value for domestic hot water.

```
Supply temp. HW1
  Actual: 53.0 °C
Setpoint: 55.0 °C
```

9.1.4 HP1

```
Boiler temp: 55.0°C
```

Submenu: Return temp.

```
Return temp. HP1
 45°C
```

Submenu: Start and stop temperatures for the pump

```
Loading HP1
Start temp: 46.0 °C
 Stop temp: 55.0 °C
 Diff.temp: 2.0  °C
```

9.1.5 Boiler

```
Boiler temp: 48.5 °C
```

Submenu: Return temperature

```
Return temp
Boiler: 46.2 °C
```

Submeny alternative 1: Start and stop temperatures when the boiler is controlled via a constant setpoint.

```
Start temp1:  45.0  °C
Start temp2:  40.0  °C
 Stop temp1:  55.0  °C
 Stop temp2:  55.0  °C
```

Submeny alternative 2: Start and stop hystereses when the boiler setpoint is dependent on the setpoints of other control functions.

```
Start hyst1:   2.0   °C
Start hyst2:   4.0   °C
 Stop hyst1:   0.0   °C
 Stop hyst2:   2.0   °C
```

Submenu: Run time

```
Run time
Step 1:    h
Step 2:    h
```

Submenu: Number of starts

```
Number of starts
Step 1:
Step 2:
```

9.2 Control temp

General

In order to achieve precision control, the control parameters must be adjusted according to the prevailing conditions. The lower the P-band and I-time, the faster the controller. However, it is important that the values are not set too low as this may lead to the system being unstable. It is also important not to set the values too high as this will make the temperature drift above and below the setpoint.

The P-band gives proportional output to the control error.

The I-time influences the controller output signal over time.

9.2.1 HS1, HS2 and HS3

Setting of the P-band and I-time for the controller.

```
HS1
P-band: 100.0 °C
I-time: 100.0 sec
```

Submenu: Only shown for HS1 and HS2.

```
HS1 Return temp.
P-band: 100.0 °C
I-time: 100.0 sec
```

9.2.2 CS1

```
CS1
P-band: 100.0 °C
I-time: 100.0 sec
```

9.2.3 HW1 and HW2

```
HW1
P-band:  25.0 °C
I-time:  75.0 sec
D-time   0.0  sec
```

9.3 Manual/Auto

General

This is a very handy feature which simplifies the checking of individual functions in the Corrigo.

It is also possible to manually control each of the temperature output signals individually. All the configured digital outputs can be set to On, Off or Auto.

A number of other functions can also be run manually.

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. Digital signals can, in addition to Auto, normally be set to Off or On, indicating the two possible states of a digital signal.

9.3.1 HS1, HS2 and HS3

Manual operation/reading of the control signal to the actuators.

```
Manual/Auto
HS1
Auto
Manual set: 37
```

Submenu (only HS1 and HS2):

When the controller is set for return temperature control, the output to the actuator will be overridden invertedly, i.e. 100% will give 0V analogue output.

```
Manual/Auto
HS1 Return temp.
Auto
Manual set: 37
```

Submenu: For manual operation/reading of the pumps

```
Manual/Auto HS1
P1A: Auto
P1B: Auto
```

9.3.2 CS1

```
Manual/Auto
CS1
Auto
Manual set: 0.0
```

Submenu: For manual operation of the pump

```
Manual/Auto CS1
P1A:Auto
P1B:Auto
```

9.3.3 HW1 and HW2

```
Manual/Auto
HW1
Auto
Manual set: 37.0
```

Submenu: For manual operation of the pump (only HW1)

```
Manual/Auto
HWC1:Auto
```

9.3.4 HP1

```
Manual/Auto
HP1:Auto
```

9.3.5 Boiler

```
Manual/Auto
Boiler:Auto
```

9.4 Economy/Comfort function

General

Each day has two settable comfort temperature periods. When the heating systems are not in their comfort periods, they are set to ECO (economy mode) and the setpoint is lowered by five room degrees (settable), each room degree corresponding to a reduction in the supply temperature setpoint by three degrees. When the cooling system is not in its comfort periods, the supply setpoint is increased by a settable number of degrees.

The comfort function is inactive on delivery and must be activated for each of the different systems if economy mode is to be utilised.

9.4.1 HS1, HS2, HS3, HW1, HW2 and CS1

```
HS1 ECO/Comf. mode
On                →
 5°C room-degrees
```

Submenu: Setting of comfort times

For each control system there are 8 separate setting menus, one for each weekday and one extra for holidays. The holiday schedule takes precedence over other schedules.

To run the unit 24 hours a day, a period is set to 00:00 – 24:00.

To disable a period, it is set to 00:00 – 00:00.

```
HS1 Comfort time
Monday
Per 1: 07:00 – 16:00
Per 2: 00:00 – 00:00
```

```
HS1 Comfort time
Tuesday
Per 1: 07:00 – 16:00
Per 2: 00:00 – 00:00
```

```
HS1 Comfort time
Wednesday
Per 1: 07:00 – 16:00
Per 2: 00:00 – 00:00
```

```
HS1 Comfort time
Thursday
Per 1: 07:00 – 16:00
Per 2: 00:00 – 00:00
```

```
HS1 Comfort time
Friday
Per 1: 07:00 – 16:00
Per 2: 00:00 – 00:00
```

```
HS1 Comfort time
Saturday
Per 1: 00:00 – 00:00
Per 2: 00:00 – 00:00
```

```
HS1 Comfort time
Sunday
Per 1: 00:00 – 00:00
Per 2: 00:00 – 00:00
```

```
HS1 Comfort time
Holiday
Per 1: 00:00 – 00:00
Per 2: 00:00 – 00:00
```

9.5 Time/Timer outputs

General

Corrigo E has a year-based clock function with automatic summertime/wintertime change-over. For Timer output 1-5 to be shown in the display, they must be configured first.

```
Time/Date
Timer output 1
Timer output 2
Timer output 3
Timer output 4
Timer output 5
```

9.5.1 Time/Date

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

Time is shown in 24-hour format.

Date is shown in the format YY:MM:DD.

```
Time: 18:21
   Date: 10:01:01
Weekday: Wednesday
```

9.5.2 Timer outputs

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

```
Timer output 1
Monday
Per 1: 07:00 – 16:00
Per 2: 00:00 – 00:00
```

9.6 Holidays

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

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

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

```
Holidays  (mm:dd)
1: 01:01 - 02:01
2: 09:04 – 12:04
3: 01:05 - 01:05
```

9.7 Energy/Cold water

In this menu the pulse-counter input results are administered. The pulse constants (pulses/unit) are set in the menu Configuration/Pulse constants.

```
Heating meter
Cold water meter 1
Cold water meter 2
Electricity meter
Leakage monitoring
```

9.7.1 Heating meter

```
Energy total
 1532.3   MWh
Hot water total
 387.02   m3
```

The below values can be reset.

```
Energy
    Today: 28.15   kWh
Yesterday: 123.45  kWh
D B Y-day: 132.11  kWh
```

```
Usage
    Today: 28.15   lit
Yesterday: 123.45  lit
D B Y-day: 132.11  lit
```

```
Power usage
  Instant: 2100.0
Average/h: 3200.0
Max aver.: 5300.0
```

9.7.2 Cold water meters CW1 and CW2

```
CW1 Usage total
 276.22    m3
CW1 Flow
 156.4     l/min
```

```
CW1 Usage
    Today: 88.1   lit.
Yesterday: 4123.4 lit
D B Y-day: 5012.1 lit
```

```
Lowest CW1 usage
Today: 0.1 lit./h
Yest.: 0.2 lit./h
```

9.7.3 Electricity meter

```
Energy total
 1866.54  MWh
```

The value can be reset.

9.7.4 Leakage power

```
Leakage power
1.31  kW
```

9.8 Running mode

Running mode is a read-only menu. No changes can be made here. It is only intended for reading of actual values and alarm history.

```
Alarm events
Input/Output
```

9.8.1 Alarm events

Corrigo E has an alarm log which contains the 40 latest alarm events. The latest event is shown at the top of the list. The alarm log is only used to view alarm history, which may simplify troubleshooting of the installation.

```
14 Jul 18:57  B
Sensor error CS1 Return

Activated
```

```
14 Jul 19:05 B
Sensor error CS1 Return

Acknowledged
```

```
14 Jul 19:10 B
Sensor error CS1 Return

Switches off
```

9.8.2 Inputs/Outputs

In the menu Inputs/Outputs you can read the present raw values from the sensors, the output to the analogue outputs and the present status of the digital inputs/outputs.

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

```
Ai1:  -3.5 Outdoor temp
Ai2:  53.7 HS1 Supply
Ai3   54.8 HW1 Supply
Ai4:  50.6 HS1 Return
```

```
DO1: On HS1-PumpA
DO2: Off HS1-PumpB
DO3: Off Inc HS1-Act.
DO4: On Dec HS1-Act.
DO5: On HWC1-Pump
DO6: On HS2-PumpA
DO7: On Sum alarm
```

Chapter 10 **Expansion units**

To be able to use expansion units, a 2-port Corrigo E must be used as master unit.

There are eight different 2-port Corrigo models with 15/28 inputs/outputs, with or without display and with or without TCP/IP port. For a list of the different models, see the Corrigo E model overview in chapter 2.

10.1 Port 1

On a 2-port Corrigo, port 1 is used for connection to E tool and possibly a SCADA system. In an Exx2-S-WEB model, port 1 is the TCP/IP output.

10.2 Port 2

Port 2 is used for expansion units, e.g. expansion controllers or M-Bus meters. As a maximum, either three meters or two expansion controllers can be connected. The controllers must be of the type Corrigo E. There is no point in utilising slave controllers with display since the display cannot be used or show anything. However, it is possible to use Corrigo E models with display as expansion controllers.

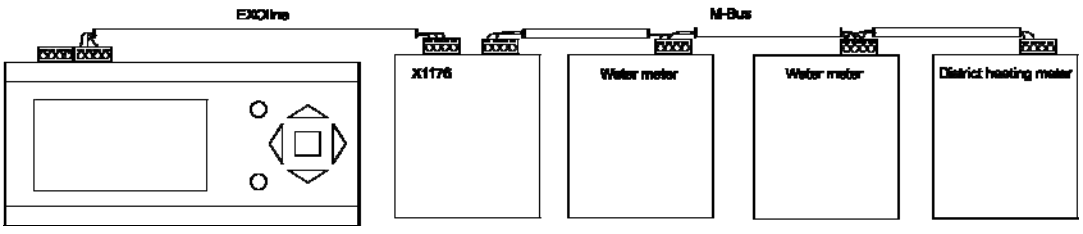
The first time you start up a slave controller without display, an external display is required to activate the controller as an expansion controller. If the initiation is done via E tool, an external display is not required.

All configuration takes place either via E tool or via the display on the master controller. All inputs and outputs can be viewed in the master controller. For configuration of port 2, see the section 8.16.2 Expansion units.

10.3 Wiring

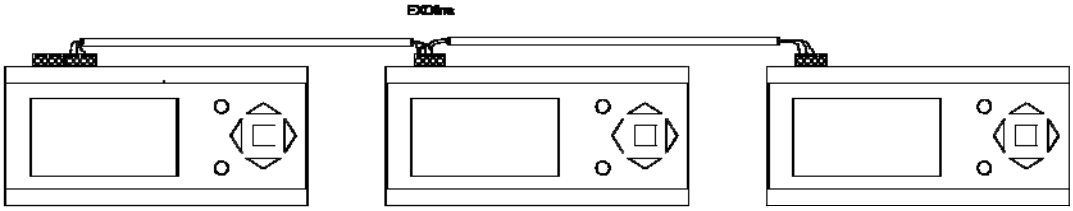
10.3.1 M-Bus meters

When the Corrigo is intended to handle measured values from up to three meters, the external communication converter X1176 is utilised. Communication between X1176 and the meters takes place via M-Bus while communication between X1176 and Corrigo E takes place via EXOline.



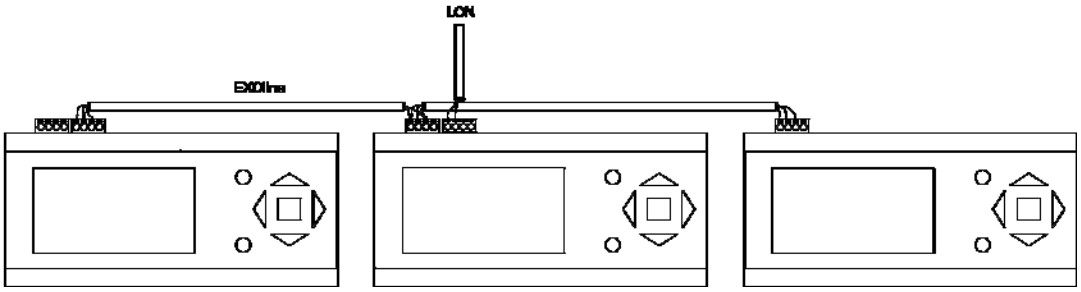
10.3.2 Expansion controllers EXOline

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



10.3.3 Expansion controllers LON

For a 2-port Corrigo to be able to communicate via LON, the first expansion controller must have a LON port. Communication between the master and expansion controllers takes place via EXOline.



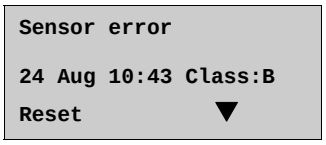
Chapter 11 **Other functions**

14.1 Alarm handling

If an alarm condition occurs the red alarm LED on the front panel on units with display will start flashing. The LED will continue to flash as long as there are unacknowledged alarms.

Alarms are logged in the alarm list. The list shows type of alarm, date and time for the alarm and the alarm class (A, B or C alarm).

To access the alarm list, press the alarm button, the front panel button with the red button-top.



If there are multiple alarms, this is indicated by up / down arrow symbols at the right-hand edge of the display.

Use the UP and DOWN buttons to access the other alarms.

At the left end of the bottom display line the alarm status is shown. For active, unacknowledged alarms the space is blank. For alarms that have reset the text: “Reset” is shown, Acknowledged, still active or blocked alarms are indicated by Acknowledged or Blocked.

Alarms are acknowledged by pressing the OK button. You are then given the choice of acknowledging the alarm or blocking the alarm.

Acknowledged alarms will remain on the alarm list until the alarm input signal resets.

Blocked alarms remain on the alarm list until the alarm has reset and the block has been removed. New alarms of the same type will not be activated as long as the block remains.

Since blocking alarms can be potentially hazardous, you need a high log on authority 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.

Alarm events

Corrigo E also has an alarm log which contains the 40 latest alarm events. For more information, see section 9.8.1.

14.2 Free text

If RIGHT is pressed once when the start-menu is shown, see section 8.14.2, 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 using E tool. Up to 4 lines of 20 characters can be entered.

14.3 Revision number

If RIGHT is pressed twice when the start-menu is shown, see section 8.14.2, a menu showing the program revision number and ID number is displayed.

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