



# Corrigo E - User Manual

## Heating



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# User manual Corrigo E Heating

## Revision C Oct 2006

This user manual covers all models the Corrigo E series heating controllers.

For detailed description of modules for external communication, LON, Modbus etc. we refer to separate documentation.

Also for the PC-software Corrigo E Tool there is a separate manual.

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® Corrigo

## 1. About Corrigo E

Corrigo E for heating is a complete new range of programmable controllers for control of building heating systems.

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

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

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

The temperature controllers are PI-controllers for heating control and tap hot-water control with a pre-programmed set of control modes. To the controllers can be bound a number of different control functions and analogue and digital input and output functions. The choice of which functions are to be used is free, the only restriction lying in the physical number of inputs and outputs that the different models have.

The Corrigo is designed for DIN-rail mounting.

The program for a heating unit contains, apart from other things, the following functions:

### Heating sequence control:

Control of 1 - 3 individual heating circuits.

### Tap hot water control:

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

### Differential pressure control

One constant differential pressure control circuit

### Boiler control

Basic two step boiler control.

### Timer outputs

Up to 5 individually settable timer outputs for control of, for example, lighting, door locks etc.

### Timer control

Year-base clock, individual schedulers, holiday scheduler.

### Water consumption

### Energy consumption

## Corrigo E Hardware overview

Corrigo	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
TCP/IP	Option	Option	Option	Option	Option	Option
Display	No	Yes	No	Yes	No	Yes
Ext. display	Option	No	Option	No	Option	No

### 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	Settable 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	Triac outputs 24 V AC, 0.5 A continuous

### Other data

Display	4 rows of 20 characters. Background illumination.
LEDs	Yellow = Changeable parameter Red = Alarm indication
Clock	Year base 24 hour clock with battery backup. Automatic summer-/winter-time changeover.
Battery	Replaceable Lithium cell. Battery life; better than 5 years. Low battery warning.
Battery backup	Memory and real time clock
Communication	EXOline Port 1, insulated via a built-in RS485 contact.  The basic version of Corrigo E can communicate with Modbus. You need an activation code. Corrigo E can be ordered with a communication port for TCP/IP or LON.
Operating system	EXOreal
Supply voltage	24 V AC, 6 VA
Ambient temperature	0...50°C
Casing	148x123x60 (WxHxD incl. terminals), standard Euronorm casing. Protection class IP20. For DIN-rail mounting.
CE-marking	Conforms with the EMC standards: CENELEC EN61000-6-3:2001 CENELEC EN61000-6-1:2001.
<b>Options</b>	
LON	FT3150, gives a second communication route
TCP/IP	Replaces RS485 for EXOline (Port 1) communication
External hand terminal E-DSP	For use with Corrigo E units without display

## 2. Installation and wiring

### 2.1 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. 90 %RH, non-condensing

### 2.2 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.

#### 2.2.1 Supply voltage

24 V AC  $\pm 15\%$ , 50...60 Hz. 6 VA

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.

#### 2.2.2 Inputs and outputs

The list of input and output functions in section 2.2.3 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 A-gnd 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 input configured as analogue input must refer to an A-gnd terminal placed in the same terminal block as the input being wired.

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.

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

##### Analogue outputs

Analogue outputs must refer to the A-gnd 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 must refer to G on terminal 10.

All the digital outputs are triac controlled.

The outputs will deliver 24 V AC, 0.5 A continuous.

The outputs cannot be used to drive DC relays.

#### 2.2.3 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 sequence1
	Tap hot water circuit 1, supply temperature
	Return temperature Heating sequence1
	Tap hot water circuit 2, supply temperature
	Storage tank supply temperature
	Storage tank return temperature
	Wind-speed transmitter, 0...10 V DC
	Differential pressure transmitter, 0...10 V DC
	Supply temperature Heating sequence2
	Return temperature Heating sequence2
	Room temperature Heating sequence2
	Room temperature Heating sequence1
	Supply temperature Heating sequence3
	Return temperature Heating sequence3
	Room temperature Heating sequence3
	Boiler 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, P1-HW1
	Volume pulses, heating usage
	Volume pulses, cold water usage 1
	Energy pulses, heating usage
	Pressure switch, expansion vessel pressure
	External alarm
	Boiler alarm
	Run-indication/alarm circulation pump, P1A-HS3
	Run-indication/alarm circulation pump, P1B-HS3
	Run-indication/alarm frequency converter for pressure control
	Run-indication/alarm storage tank charge pump P1-HP
	External power limitation
	Volume pulses, cold water usage 2
	Energy pulses, electricity meter

Note: 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 input signals above.

### Analogue outputs

✓	Analogue output signal
	Valve actuator, Heating sequence1, HS1
	Valve actuator, hot water circuit 1, HW1
	Valve actuator, Heating sequence2, HS2
	Valve actuator, Heating sequence3, HS3
	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
	Actuator HS1 increase
	Actuator HS1 decrease
	Start/stop pump, P1-HW1
	Start/stop pump, P1A-HS2
	Start/stop pump, P1B-HS2
	Actuator HS2 increase
	Actuator HS2 decrease
	Start/stop pump, P1A-HS3
	Start/stop pump, P1B-HS3
	Actuator HS3 increase
	Actuator HS3 decrease
	Actuator HW1 increase
	Actuator HW1 decrease
	Actuator HW2 increase
	Actuator HW2 decrease
	Start/stop charge pump for storage tank, P1-HP1
	Start frequency converter for diff pressure control
	Start step 1, boiler
	Start step 2, boiler
	Time channel 1
	Time channel 2
	Time channel 3
	Time channel 4
	Time channel 5
	Sum alarm A
	Sum alarm B
	Sum alarm A + B

### Wiring diagram Corrigo E28 Factory configuration

1	G	Supply voltage 24 V AC, $\pm 15\%$ . 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-HW1
16	DO6	Start/stop pump, P1A-HS2
17	DO7	Sum alarm A + B
30	Agnd	Reference pole for analogue inputs AI
31	AI1	Outdoor temperature sensor
32	AI2	Supply temp, heating sequence 1, HS1
33	Agnd	Reference pole for analogue inputs AI
34	AI3	Supply temp, hot water sequence 1, HW1
35	AI4	Return temp, heating sequence 1, HS1
40	Agnd	Reference pole for universal inputs UI
41	UI1	Supply temp, heating sequence 2, HS2
42	UI2	Return temp, heating sequence 2, HS2
43	Agnd	Reference pole for universal inputs UI
44	UI3	Room sensor heating sequence 1, HS1
45	UI4	Room sensor heating sequence 2, HS2

50	B	RS485 EXOline / Modbus
51	A	
52	N	
53	E	
57	Net+	LON-connection (LON-versions only)
58	Net-	
59	Egnd	
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-HW1
75	DI5	Volume pulse, heating usage meter
76	DI6	Energy pulse, 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	Actuator Heating sequence1, HS1
92	AO2	Actuator Heating sequence2, HS2
93	AO3	Actuator Heating sequence3, HS3
94	AO4	
95	AO5	

This is the wiring for the factory set configuration.

### Wiring diagram Corrigo E15H Factory configuration

1	G	Supply voltage 24 V AC, $\pm 15\%$ . 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-HW1
14	DO4	Sum alarm A + B
30	Agnd	Reference pole for analogue inputs AI
31	AI1	Outdoor temperature sensor
32	AI2	Supply temp, heating sequence 1, HS1
33	Agnd	Reference pole for analogue inputs AI
34	AI3	Supply temp, hot water sequence 1, HW1
35	AI4	Return temp, heating sequence 1, HS1

50	B	RS485 EXOline / Modbus
51	A	
52	N	
53	E	
57	Net+	LON-connection (LON-versions only)
58	Net-	
59	Egnd	
71	DI1	Run-indication/alarm pump, P1A-HS1
72	DI2	Run-indication/alarm pump, P1B-HS1
73	DI3	Run-indication/alarm pump, P1-HW1
74	DI4	Pressure switch, expansion vessel
90	Agnd	Reference for analogue outputs AO
91	AO1	Actuator Heating sequence1, HS1
92	AO2	Actuator Heating sequence2, HS2
93	AO3	Actuator Heating sequence3, HS3

This is the wiring for the factory set configuration.

### Wiring diagram Corrigo E8H Factory configuration

1	G	Supply voltage 24 V AC, ±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-HS11
12	DO2	Start/stop pump, P1B-HS11
30	Agnd	Reference pole for analogue inputs AI
31	AI1	Outdoor temperature sensor
32	AI2	Supply temp, heating sequence 1, HS1

50	B	RS485 EXOline / Modbus
51	A	
52	N	
53	E	
57	Net+	LON-connection (LON-versions only)
58	Net-	
59	Egnd	
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 output AO
91	AO1	Actuator Heating sequence1, HS1

This is the wiring for the factory set configuration.

### Empty wiring diagram Corrigo E28H

1	G	Supply voltage 24 V AC, ±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	
12	DO2	
13	DO3	
14	DO4	
15	DO5	
16	DO6	
17	DO7	
30	Agnd	Reference pole for analogue inputs AI
31	AI1	
32	AI2	
33	Agnd	Reference pole for analogue inputs AI
34	AI3	
35	AI4	
40	Agnd	Reference pole for universal inputs UI
41	UI1	
42	UI2	
43	Agnd	Reference pole for universal inputs UI
44	UI3	
45	UI4	

50	B	RS485 EXOline / Modbus
51	A	
52	N	
53	E	
57	Net+	LON-connection (LON-versions only)
58	Net-	
59	Egnd	
71	DI1	
72	DI2	
73	DI3	
74	DI4	
75	DI5	
76	DI6	
77	DI7	
78	DI8	
90	Agnd	Reference for analogue outputs AO
91	AO1	
92	AO2	
93	AO3	
94	AO4	
95	AO5	

### Empty wiring diagram Corrigo E15H

1	G	Supply voltage 24 V AC, $\pm 15\%$ . 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	
12	DO2	
13	DO3	
14	DO4	
30	Agnd	Reference pole for analogue inputs AI
31	AI1	
32	AI2	
33	Agnd	Reference pole for analogue inputs AI
34	AI3	
35	AI4	

50	B	RS485 EXOline / Modbus
51	A	
52	N	
53	E	
57	Net+	LON-connection (LON-versions only)
58	Net-	
59	Egnd	
71	DI1	
72	DI2	
73	DI3	
74	DI4	
90	Agnd	Reference for analogue outputs AO
91	AO1	
92	AO2	
93	AO3	

### Empty wiring diagram Corrigo E8H

1	G	Supply voltage 24 V AC, $\pm 15\%$ . 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	
12	DO2	
30	Agnd	Reference pole for analogue inputs AI
31	AI1	
32	AI2	

50	B	RS485 EXOline / Modbus
51	A	
52	N	
53	E	
57	Net+	LON-connection (LON-versions only)
58	Net-	
59	Egnd	
71	DI1	
72	DI2	
73	DI3	
90	Agnd	Reference for analogue output AO
91	AO1	

## 3. 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 downloaded to the Corrigo.

An infinite number of different configurations can be saved in computer memory for later use.

### 3.1. 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 5 and 6 *Display, buttons and LEDs* 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 4 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 2, (2.2.3 *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 *Timers*.
- 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 aren't used during commissioning.

#### Functional description

Start by reading the chapter 4. *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 5 on how to use the front panel buttons to navigate the Corrigo E menu system.

#### Access rights

Chapter 6. Learn how to log in on the Corrigo E

#### Configuration

Chapter 7. 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 2 *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 in use.

Set the alarm parameters; alarm levels and delay times.

#### Timer settings

Set the clock and calendar functions

#### Setpoints

Set all the setpoints for all active control loops.

#### Hand/Auto

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

## 4. Functional description

### 4.1 Heating systems

#### 4.1.0 General

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

#### 4.1.1 Controllers

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

#### 4.1.2 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.

#### 4.1.3 Adaptation of curves

Room sensors can be used to correct the control curves. The average room temperature error over 24 hours 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:

$$\text{Displacement} = (\text{Room setpoint} - \text{Average temp}) * \text{Factor}$$

#### 4.1.4 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.

#### 4.1.5 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.

#### 4.1.6 Wind compensation

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

#### 4.1.7 Building inertia and boost

The building inertia 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 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:

$$\text{Displacem.} = \text{Factor} * (17 - \text{outdoor temp}) * \text{night set-back}$$

Where 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:

$$\text{Time} = 1.6 * (17 - \text{Outdoor temp})$$

Time is limited to maximum 60 minutes.

#### 4.1.8 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.

#### 4.1.9 Power limitation

Using a digital input the power to the heating systems can be temporarily restricted. 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:

$$\text{Limited setpoint} = 20 + (\text{Setpoint} - 20) * \text{Factor} / 100$$

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

## 4.2 Tap hot water

### 4.2.0 General

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

### 4.2.1 Controllers

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

### 4.2.3 Night set-back

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

### 4.2.4 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.

### 4.2.5 Periodic overheating

Once daily, at 02:00 am the temperature set-point can be increased to 62°C to prevent growth of Legionella bacteria.

The raised set-point is maintained until the supply temperature reaches 60°C but not shorter than 1 minute and not longer than 5 minutes. If the pump is stopped it will start and run for the duration of the overheating period plus 2 minutes.

## 4.3 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.

## 4.4 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.

## 4.5 Boiler control

A simple boiler control can be enabled.

When the boiler temperature falls below Start temperature 1 the digital signal Start 1 will be activated. Should the temperature fall below Start temperature 2 the digital output Start 2 will be activated.

Any active outputs will be deactivated when the boiler temperature rises above the set Stop temperature.

## 4.6 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.

### 4.6.1 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
- Usage total in m<sup>3</sup>. The value is resettable
- Water-flow (litres / min)

### 4.6.2 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.

## 4.7 Energy monitoring

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

### 4.7.1 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 is resettable

### 4.7.2 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

### 4.7.3 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.

### 4.7.4 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.

## 4.8 Electricity meter

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

### 4.8.1 Usage values

Total usage in MWh. The value is resettable.

## 4.9 Timer channel outputs

Up to 5 digital outputs can be used as timer controlled outputs.

These can be used for controlling, for example, door locks, lighting, laundry-room equipment etc. Each timer has its own scheduler with two activation periods for each day of the week and a year-based holiday calendar.

## 4.10 Alarms

### 4.10.1 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.

### 4.10.2 Alarm priorities

Alarms can be given different priority levels. 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. 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.

### 5.1 Display

The display has 4 rows of 20 characters.

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

### 5.2 LEDs

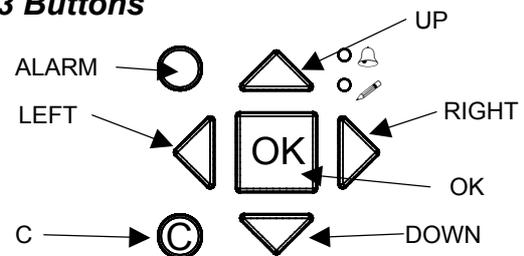
There are two LEDs on the front:

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.

### 5.3 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.

The OK button is used to confirm the choice of a parameter setting.

The C button

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.

The ALARM button is used to access the alarm list.

### 5.4 Navigating the menus

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.

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 parameter

In some menus there are parameters that can be set. This will be indicated by the 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.

## 6. 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 level gives read-only access to all settings and parameters and write access to all settings and parameters in all menus except *Configuration*.

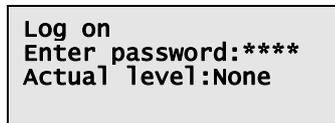
The basic level permits read-only access to all settings and parameters.

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
```

### 6.1 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.

### 6.2 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.

### 6.3 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.

```
Change password for
Level:Operator
New password: ****
```

## 6.4 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. Configuration

Start by logging on at System level. See section Access rights above.

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

The main configuration menu will be shown:

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

### 7.1 In- and Outputs

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

#### 7.1.0 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.

#### 7.1.1 Analogue inputs AI

```
Analogue input 1
Sign: Outdoortemp
Raw value: 18.3
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.

If an input has been assigned to pressure control the following submenu will be available:

```
AI2 Pressure at
0V: 0.0 kPa
10V: 10.0 kPa
Filter factor: 0.2
```

## 7.1.2 Digital inputs DI

```
Digital input 1
NO/NC: NO Signal:
HS1-PumpA
Status: Off
```

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

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

## 7.1.3 Universal inputs UI

On the largest hardware version, E28 there are universal inputs.

These can individually be configured as either analogue inputs or as digital inputs.

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

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

```
Universal input 1 →
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.

```
Universal AI1
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 an input has been assigned to pressure control the following submenu will be available:

```
UAI1 Pressure at
0V: 0.0 kPa
10V: 10.0 kPa
Filter factor: 0.2
```

```
Universal DI1
NO/NC: NO Signal:
HS1-PumpA
Status: Off
```

To simplify adaptation to external functions, all universal inputs configured as digital inputs can be set as 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.

## 7.1.4 Analogue outputs

Analogue outputs are 0...10 V DC.

```
Analogue output 1
Sign: HS1 Actuator
Auto
Value: 2.3 V
```

## 7.1.5 Digital outputs

```
Digital output 1
Signal: HS1-PumpA
Auto
Status: On
```

## 7.2 HS Heating System, supply

### 7.2.1 Parallel displacement

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

```
Parallel displacemnt
HS1: 0.0 °C
HS2: 0.0 °C
HS3: 0.0 °C
```

### 7.2.2 Maximum limit

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

```
Maximum limit
HS1: 98 °C
HS2: 98 °C
HS3: 98 °C
```

### 7.2.3 Minimum limit

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

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

### 7.2.4 Auto-correction of setpoint

Room sensors can be used to correct the control curves. The average room temperature error over 24 hours 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

### 7.3 Return water temperature

Individual maximum and minimum return water temperatures can be set for the heating systems. Should the water temperature go outside the set limits the supply water temperature will be adjusted to correct. The adjustment will be the temperature offset multiplied by the set limiting factor.

#### 7.3.1 Maximum temperature

Max. return temp. →  
HS1:Active  
HS2:Inactive  
HS3:Inactive

Max. return temp  
HS1: 50°C  
HS2: 50°C  
HS3: 50°C

#### 7.3.2 Minimum temperature

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

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

#### 7.3.3 Limiting factor

Return limit factor.  
HS1: 1.00  
HS2: 1.00  
HS3: 1.00

### 7.4 Pump stop

Each heating system has individual day and night stop temperatures. An active circulation pump will stop if the outdoor temperature is higher than the set value and there is no heating demand.

The pump will start if the temperature falls below the set stop temperature less the set hysteresis. 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

### 7.5 Twin pump / Single pump

Each heating 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

### 7.6 Run indication/Motor protection

Inputs are used either for indication of the motor running or for monitoring of motor protection contacts.

Run indication input should be normally closed. Open contact when the motor is running, i.e. motor control output is activated, will generate an alarm

Motor protection should be normally open. Closed contact when the motor is running, i.e. motor control output is active, will generate an alarm.

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

Run ind./Motor prot  
HW1: Motor prot  
HP1: Motor prot  
Freq.Con: Motor prot

### 7.7 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  
HW1: 0-10V  
HW2: 0-10V  
Freq: 0-10V

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...10V 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.

## 7.8 Running time, 3-pos. actuators

These parameters have no function if analogue actuators are configured.

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

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

Actuator run time  
HS1: 255 sec  
HS2: 255 sec  
HS3: 255 sec

Actuator run time  
HW1: 80 sec  
HW2: 80 sec

## 7.9 Valve exercising

The valves can be exercised once daily. Default time is 3:00 pm but can be set to any time. The actuators will be forced to either endpoint for the set actuator running time. The pumps will run and the temperature offset alarm will be blocked for the duration of the exercising.

Actuator exercise  
HS1: Off  
Hour for exerc.: 15  
Minute for ex.: 00

## 7.10 Leakage monitoring

Once a week, the control valves will be closed and the energy usage measured for a preset time. An alarm is generated should the energy leakage be larger than a settable value, default 3.0 kW.

The time for and duration of the leakage monitoring is settable. Default is Sundays at 2:00 am for 30 minutes.

Leakage mon:Off  
Weekday:Sunday  
Hour: 2  
Duration: 30 min

Permitted leakage  
3.00 kw  
Start monitoring now  
No

## 7.11 Pulse inputs

Energy pulse heating  
100.0 kwh/Pulse  
Volume pulse heating  
10.0 liters/Pulse

Cold water 1  
10.0 liters/Pulse  
Cold water 2  
10.0 liters/Pulse

Electric meter  
100.0 kwh/Pulse

## 7.12 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 or not active.

Alarm no (1-65): 1  
Malfunction P1A-HS1  
→

Malfunction P1A-HS1  
Priority: B-alarm

### Alarm list

Values in the Priority column 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. Frequenc	B	Malfunction frequency converter
8	Malf. P1-HWC	A	Malfunction pump P1-HWC
9	Malf. P1-VVB	-	Malfunction pump P1-VVB
10	Exp. vessel	A	Expansion vessel alarm
11	External alarm	A	External alarm
12	Boiler alarm	A	Boiler alarm
13	Deviation HS1	A	Supply temp HS1 deviates too much from the setpoint for too long.

	Alarm text	Pri	Description
14	Deviation HS2	A	Supply temp HS2 deviates too much from the setpoint for too long.
15	Deviation HS3	A	Supply temp HS3 deviates too much from the setpoint for too long.
16	Deviation HWC1	A	Supply temp HWC1 deviates too much from the setpoint for too long.
17	Deviation HWC2	A	Supply temp HWC2 deviates too much from the setpoint for too long.
18	Sensor error	B	Malfunction of a connected sensor
19	High HWC1	B	HWC1 temperature too high
20	High HWC2	B	HWC2 temperature too high
21	Boiler high	B	Boiler temperature too high
22	Boiler low	B	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	B	24 hour cold water usage higher than limit
26	High energy	B	24 hour energy usage higher than limit
27	High cold water/hour	B	Cold water usage / hour higher than min. limit
28	High leakage	B	Leakage higher than set value
29	Malf. P1A&B-HS1	A	Malfunction both circulation pumps P1A and P1B in HS1
30	Malf. P1A&B-HS2	A	Malfunction both circulation pumps P1A and P1B in HS2
31	Malf. 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 mode
35	HS2 manual	C	HS2 in manual mode
36	HS3 manual	C	HS3 in manual mode
37	HWC1 manual	C	HWC1 in manual mode
38	HWC2 manual	C	HWC2 in manual mode
39	Press. manual	C	Pressure control in manual mode
40	Boiler manual	C	Boiler in manual mode
41	P1A-HS1 manual	C	P1A-HS1 in manual mode
42	P1B-HS1 manual	C	P1B-HS1 in manual mode
43	P1A-HS2 manual	C	P1A-HS2 in manual mode
44	P1B-HS2 manual	C	P1B-HS2 in manual mode

	Alarm text	Pri	Description
45	P1A-HS3 manual	C	P1A-HS3 in manual mode
46	P1B-HS3 manual	C	P1B-HS3 in manual mode
47	P1-HWC1 manual	C	P1-HWC1 in manual mode
48	P1-HWC2 manual	C	P1-HWC2 in manual mode
49	P1-Freq. Manual	C	P1- frequency controlled in manual
50	HS1 Supply max	B	HS1 supply temp maximum limit activated
51	HS2 Supply max	B	HS2 supply temp maximum limit activated
52	HS3 Supply max	B	HS3 supply temp maximum limit activated
53	HS1 Supply min	B	HS1 supply temp minimum limit activated
54	HS2 Supply min	B	HS2 supply temp minimum limit activated
55	HS3 Supply min	B	HS3 supply temp minimum limit activated
56	HS1 Return max	B	HS1 return temp maximum limit activated
57	HS2 Return max	B	HS2 return temp maximum limit activated
58	HS3 Return max	B	HS3 return temp maximum limit activated
59	HS1 Return min	B	HS1 return temp minimum limit activated
60	HS2 Return min	B	HS2 return temp minimum limit activated
61	HS3 Return min	B	HS3 return temp minimum limit 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	Battery error	B	Malfunction of the internal memory-backup battery

## 7.13 Other parameters

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

### 7.13.1 Building inertia and boost

For detailed information, see 4.1.7 Building inertia and boost.

The building inertia is settable to one of three levels:

None, Medium or High

The displacement is calculated as follows:

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

Where Factor is a settable factor 0...10 where 0 gives no boost and 10 gives maximum boost.

Boost duration time is calculated as below:

**Time=1.6\*(17 - outdoor temp)**

**Building inertia**  
None  
**Boost factor (0-10)**  
1

### 7.13.2 Power limitation

Using a digital input the power to the heating systems can be temporarily restricted. 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 lowering, 0 gives full lowering to 20°C.

### 7.13.3 Frost protection

If the controller is in mode Off or Manual and the outdoor temperature falls below a settable value, a settable, minimum supply temperature will be maintained. Circulation pumps will be activated

**Frost protect.:off**  
**Outdoor temp activ.**  
**Frost prot:0.0°C**  
**Min sup. temp:10.0°C**

### 7.13.4 Split of output signal

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

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

### 7.13.5 Periodical heating

**Periodical heating**  
HW1: NO  
HP1: NO

## 7.14 System

### 7.14.1 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.

### 7.14.2 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**  
04:03:15 11:28  
HS1  
Sp: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**  
04:03:15 11:28  
HWC1  
Sp:55.0°C Act:54.8°C

### Type 3

The second line shows the text HS1/HWC1.

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

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

```
Heating Regulator
HS1/HWC1
Sp:32.8°C Act:33.1°C
Sp:55.0°C Act:54.8°C
```

### Type 4

The second line shows the 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
```

## 7.14.3 Automatic summer time 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
```

## 7.14.4 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
```

## 7.14.5 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
```

## 7.14.6 Communication code Modbus

If Corrigo is to be wired to a network for Modbus communication, a special code must be purchased from Regin. Entering the code unlocks the unit so the addresses can be changed.

The code is unique for each Corrigo and is serial-number dependent.

```
Communication code
for modbus
0
Modbus: Not Active
```

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

## 7.14.7 Dial-up modem

With the help of a dial-up modem, Corrigo can be connected to a supervisor Exo-system. We recommend the modem Westermo TD-32-B. The default password is exo.

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

## 7.14.8 Alarm forwarding via SMS

Via a connected GSM modem, Corrigo can send an alarm message to up to 3 different recipients.

To use this function, you first have to purchase a lock-up code from Regin.

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.

```
Code to enable
SMS function:
0
```

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

## 8. Settings

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

### Settings

Control temp →  
Control pressure →  
Alarm settings

### 8.1 Control temp

#### 8.1.1 HS1, HS2 and HS3

Control parameters for the three heating system controllers

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

#### 8.1.2 HWC1 and HWC2

Control parameters for the two hot water controllers

HWC1  
P-band: 100.0 °C  
I-time: 150.0 sec  
D-time: 1.0 sec

### 8.2 Control pressure

#### 8.2.1 Control pressure

Control parameters for pressure control. Only accessible if pressure control has been configured

Pressure control  
P-band: 25.0 kPa  
I-time: 100.0 sec  
Min.output: 0%

### 8.3 Alarm settings

#### Alarm settings

Alarm limits →  
Alarm delay →

#### 8.3.1 Alarm limits

Control deviation, HS1, HS2 and HS3

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

#### Control deviation HWC1 and HWC2

Control deviation  
HWC1: 20.0 °C  
HWC2: 20.0 °C

#### Scalding limit

Scalding  
HWC1: 65.0 °C  
HWC2: 65.0 °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

#### Permitted leakage

Permitted leakage  
3.00 kw

#### 8.3.2 Alarm delays

Control deviation, HS1, HS2 and HS3

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

**Control deviation HWC1 and HWC2**

```
Control deviation
HWC1: 60 min
HWC2: 60 min
```

**Scalding limit**

```
Scalding
HWC1: 300 sec
HWC2: 300 sec
```

**Boiler limits**

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

**Expansion vessel / External alarm**

```
Expansion vessel
60 sec
External alarm
60 sec
```

## 9. Time settings

**General**

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

Individual schedules for each week-day plus a separate holiday setting.

Up to 24 individual holiday periods can be configured. Holiday schedules take precedence over other schedules.

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

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

```
Time/Date →
HS1 Night setback →
HS2 Night setback →
HS3 Night setback →
HWC1 Night setback →
HWC2 Night setback →
Timer output1 →
Timer output2 →
Timer output3 →
Timer output4 →
Timer output5 →
Holidays →
```

### 9.1 Time / Date

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

Time is shown in 24 hour format.

Date is shown in the format YY:MM:DD

```
Time: 18:21
Date: 04:02:23
weekday: Monday
```

### 9.2 HS\_ Night Set-back

```
HS1 Night Setback
On →
5.0 room-degrees
```

Setting comfort temperature periods.

For each control system there are 8 separate setting menus, one for each weekday and one extra for holidays.

Holiday schedules take precedence over other schedules.

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

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

```

HS1 Comfort time
Monday
Per 1: 07:00 - 16:00
Per 2: 00:00 - 00:00

```

### 9.3 HWC\_ Night set-back

```

HWC1 Night setback →
On
5.0 °C
Pump stop: Off

```

Setting comfort temperature periods.

For each control system there are 8 separate setting menus, one for each weekday and one extra for holidays.

Holiday schedules take precedence over other schedules.

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

To disable a period, set it to 00:00 – 0:00.

```

HWC1 Comfort time
Monday
Per 1: 07:00 - 16:00
Per 2: 00:00 - 00:00

```

### 9.4 Timer outputs 1...5

Up to 5 digital outputs can be configured as timer outputs, each with a separate week-schedule with two activation periods per day.

Holiday schedules take precedence over other schedules.

```

Timer output 2
Wednesday
Per 1: 05:30 - 08:00
Per 2: 17:00 - 23:00

```

### 9.5 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

```

## 10. Actual / Setpoint

In this menu group all actual current values and setpoint values are displayed and, providing a sufficiently high log on level is used, all setpoints can be changed.

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

### 10.1 Setpoint Heating systems HS1, HS2 and HS3

```

Outdoor temp: 18.4 °C
HS1
Act.: 19.8 °C   Setp→
Setp: 20.0 °C

```

Submenu: Setpoint

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  $77 + 3/5 * 14°C = 85.4°C$ .

```

Outd. comp. setp. HS1
-20 °C = 77 °C
-15 °C = 63 °C
-10 °C = 59 °C

```

```

Outdoor comp. setp.
-5 °C = 54 °C
0 °C = 53 °C
5 °C = 43 °C

```

```

Outdoor comp. setp.
10 °C = 35 °C
15 °C = 25 °C

```

### 10.2 Room sensor HS1, HS2 and HS3.

```

Room sensor HS1
Actual: 20.8 °C
Setpoint: 21.0 °C
Return temp: 20.0 °C

```

### 10.3 Return water temperature

```

Return temp.
HS1: 20.0 °C
HS2: 24.0 °C
HS3: 23.0 °C

```

### 10.4 Supply temp HWC1 and HWC2:

```

Supply temp. HWC1
Actual: 54.8 °C
Setpoint: 55.0 °C

```

## 11. Manual / Auto

### 10.5 Storage tank

Supply temp. HP1  
45.8 °C →  
Return temp. HP1  
38.3 °C

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

### 10.6 Boiler temp

Boiler temp: 48.2 °C  
Start temp1: 45.0 °C  
Start temp2: 40.0 °C  
Stop temp: 55.0 °C

### 10.7 Pressure control

Pressure control  
Actual: 48.8 kPa  
Setp.: 50.0 kPa

### 10.8 Wind speed

Wind speed  
Actual: 4.6 m/s  
Scale factor:  
1.0 m/s/V

Compensation  
HS1: 0.00 °C/m/s  
HS2: 0.00 °C/m/s  
HS3: 0.00 °C/m/s

### General

In this menu the running mode of the unit and all the configured outputs can be manually controlled. 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.

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

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

Heating systems HS1, HS2 and HS3

Manual/Auto  
HS1  
Auto  
Manual set: 0.0

Hot water circuits HWC1 and HWC2

Manual/Auto  
HWC1  
Auto  
Manual set: 0.0

Pressure control.

Pressure control  
Auto  
Manual set: 0.0  
Minimum set: 0.0

Pumps HS1, HS2 and HS3

Manual/Auto HS1  
P1A: Auto  
P1B: Auto

Pump HWC1

Manual/Auto  
HWC1: Auto

Frequency converter start

Manual/Auto  
Frequency conv.: Auto

Boiler start

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

## 12. 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
```

### 12.1 Heating meter

```
Energy total
1532 Mwh
Hot water total
387 m3
```

These 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: 2.1kw
Average/h: 3.2kw
Max aver.: 5.3
```

### 12.2 Cold water meters CW1 and CW2

```
CW1 Usage total
276.2 m3
CW1 Flow
6.4 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
```

## 12.3 Electricity meter



Energy total  
1866.54 mwh

The value can be reset.

## 12.4 Leakage monitoring



Leakage power  
1.31 kw

## 13. Other functions

### 13.1 Alarm handling

If an alarm condition occurs the 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.



Sensor error  
24 Feb 10:43 Class:B  
Reset ▼

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.

### 13.2 Revision numbers

If RIGHT is pressed once when the start-display is shown, see section 7.14.2, a menu showing the program revision number and id-number will be displayed.

### 13.3 Free text

If RIGHT is pressed twice when the start-display is shown, see section 7.14.2, 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.

Text is entered using E Tool. Up to 4 lines of 20 characters can be entered.



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The logo for Regin, featuring a stylized green wave icon followed by the word "REGIN" in a bold, green, sans-serif font.

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