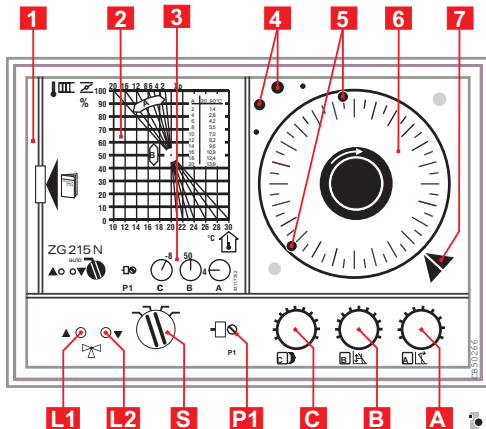
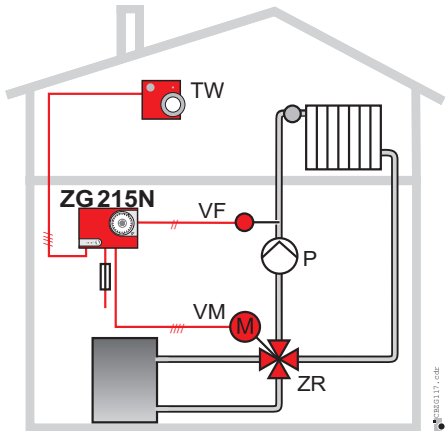


Comfort Compact Controller ZG 215N

OPERATION AND PUTTING INTO SERVICE



Hot Water Heating with Room Control



ZG Control Unit
VM Servomotor
ZR Heating mixing valve
VF Flow sensor

TW Temperature selector
with room sensor
P Heating circuit pump

Operation as a Heating Control (Fig. left)

The **remote control (TF)** is composed of a **temperature sensor** and a **temperature selector**. (If desired also two separated devices can be used.)

- The temperature sensor measures the actual room temperature.
- The desired value for the room temperature is to be set on the temperature selector.

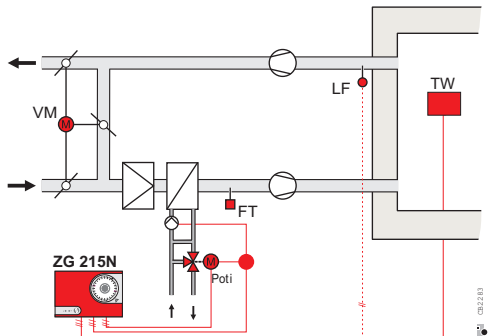
On the basis of both of these values the control unit calculates the necessary water temperature (flow temperature). It is measured by the **flow sensor (VF)**. If the flow temperature differs from the set value, the control unit adjusts the **mixing valve (ZR)** with the **servomotor (VM)** so that the right heat input is provided to the radiators.

The **mixing valve** determines the flow temperature by mixing the hot water from the boiler with the colder return water.

The **heating circuit pump (P)** provides for the circulation of the hot water. It is not operated by the control unit.

The **temperature selector (TF)** is used as a remote control, e.g. if the control unit is mounted in the cellar: by means of the selector knob **P2** the room temperature can be changed. With the party switch **S1** the night economy option can be suspended.

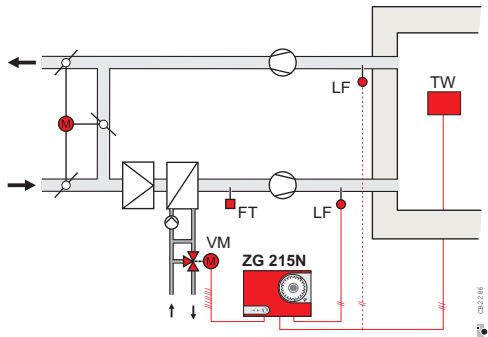
Air-handling system with mixing chamber



ZG Control Unit
VM Servomotor
ZR Heating mixing valve

LF Air duct sensor
TW Temperature selector
FT Frost protection thermo-

Air-handling system with heating coil



ZG Control Unit
VM Servomotor
ZR Heating mixing valve

LF	Air duct sensor
TW	Temperature selector
FT	Frost protection thermo-

Operation as an Air-handling Control (fig. left both)

The operation of the air-handling control is basically the same as for warm water heating. Instead of the flow temperature, the air temperature in the supply duct is measured.

The control unit calculates the necessary heat demand and regulates the drive motor so that the desired room temperature is reached. Depending on the layout of the air-handling system, the drive motor operates on a different part of the system:

- In case of a mixing chamber system the blinds for the incoming and outgoing air are set.
- In case of heating coil control the hot water temperature is set for air heating.

In both of types of system, the supply of heat is regulated so that the room temperature set with the temperature selector is maintained.

Operating and Display Components

Pos.	Function	Basic Setting
A	Proportional Range	4
B	Operating point setting	50
C	Reduced Mode	-8
P1	Sensitivity	5
S	Operating mode selector	auto
L1	“Hotter” LED	(red)
L2	“Colder” LED	(green)
1	Instructions compartment	
2	Heating curve diagram	
3	Basic Settings	
4	Reserve trip pins	
5	Inserted trip pins	
6	Timer (optional)	
7	Pointer for current time	

Settings on the Temperature Selector

P2	Selector knob	0
S1	Party switch	auto

Operating mode selector

manu the control unit is deactivated (the timer runs). The mixing valve can be set manually (by hand). The pump is switched on.

auto Recommended setting for greater energy saving: automatic change between day and reduced mode according to the timer with night switch-off.









Manual day mode, timer inactive.



Manual night mode according to the settings on the setting knobs **B** minus **C**, the timer remains inactive.

LED's

L1 L2	
 	Both LED's light up: "neutral" – mixing valve stops
 	only red LED lights up: "hotter" – mixing valve opens
 	only green LED lights up: "colder" – mixing valve closes

In the **manu** settings of the operating mode selector **S** there is no LED display.

Putting into service

- Set the timer **6** with the current time.
- Set the operating mode selector **S** to **auto**.

The remaining basic factory settings are printed under **3** on the control unit.

Timer for reduced mode **6**

With the aid of the timer, the room temperature during idle periods can be reduced automatically to save on operating costs.

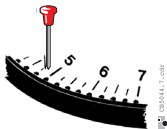
The timer has a built-in power reserve of approx. 60 hours thanks to a rechargeable battery.

Changing the program

Factory settings: **red** pin 6:00, **blue** pin 22:00.

- Pull out the trip pin and insert it again at the desired switch-on time. Push in the trip pins until they reach the stop.

Owing to the different lengths, the trip pins must always be inserted in a red/blue alternate order. The **red** trip pin switches on day mode, while the blue pin activates reduced mode.



In order to make sure that the rooms are heated well in the morning, the heating system's day mode should be activated between half an hour and an hour before using the rooms.

Energy saving tip: Reduced mode can be activated up to an hour before the room is left. The storage capacity of the heating system and building is enough to keep the rooms warm for some time.

Timer with day program

The day program is repeated every 24 hours. If a (second) decrease in temperature is desired in the course of the day to save energy, the program needs to be extended. Take the extra trip pins **4** and insert them at the desired time.

Example:

Desired time program

Normal temperature:

6:00 h to 8:00 h and 16:00 h to 22:00 h night decrease:

22:00 h to 6:00 h

day decrease: 8:00 h to 16:00 h

Position of the trip pins:

red pin	6:00 h – Start day mode (normal temperature)
blue pin	8:00 h – Start day decrease
red pin	16:00 h – Start day mode (normal temperature)
blue pin	22:00 h – Start night decrease

Timer with week program

The timer has a changeable dial.

With the **week program** dialing a different heating program for each weekday is possible.

The dial is prepared ex factory for the day program and, if required, it can be changed to week program (see installation instructions).

Setting the right time

To set the time, the time dial is to be placed on the trip pins and **turned clockwise** until the indication on the setting marker **7** matches with the current time.

Optimization of the Settings

Basic Setting

(for hot water heating operating with temperature between 20 and 90 °C)

A → 4 **B** → 50 **C** → -8

- During the regulation procedure open the radiator valves completely. (Set the thermostat valves at the maximum value).
- **If in the test room (room where the temperature sensor is located) radiator valves are installed, these must be left open always.**
- Close all windows and doors.
- Proceed gradually by making only small changes.
- Wait for the outcome of the change after each setting (approx. 1 h).

Depending on the type of system – radiator/convector heating (up to 90 °C), low temperature heating, air heating, mixing chamber regulation – and depending on the layout of the heating surfaces various flow or supply temperatures are needed to reach the right room temperature – and hence also different settings on the setting knobs.

Proportional range: Setting knob **A**

To make sure that the control unit maintains the desired room temperature, an operating range (regulation range) is to be given. The operating range defines the relation between the room temperature and flow temperature or the setting of the regulating unit. Since there is always a specific relation (proportion) between the room and flow temperature in the operating range, it is also called proportional range X_p . For most 90/70 hot water heating systems, **A** → 4 is correct as the basic setting.

If with this setting (**A** → 4) a constant room temperature is obtained and the mixing valve position remains more or less the same over a long period of time, no correction is necessary.

If, however, periodic room temperature oscillations occur, because the mixing valve opens and closes intermittently, a larger proportional range is to be set (e. g. **A** → 5).

Description of the Operating Diagram

With the setting knob **A** the proportional range can be set. The numeric value set on setting knob **A** means a proportional range in % (or °C) for an operating range of the actuator of 0 to 100 %. The smaller the numeric value on the setting knob **A**, the steeper the operating characteristic curve of the regulation is. A steep operating characteristic curve implies that already at a small room temperature oscillation a relatively intense heat convection to the room occurs.

With large numeric values on the setting knob **A** the operating characteristic curve of the control unit is more level. For a small deviation in the set room temperature, the supply of heat to the room is hence changed only slightly and for fine dosing.

All the characteristic curves split in the operating point to indicate the rotation of the operating characteristic curve when turning the setting knob **A**. The illustrated characteristic curves **A** → 4 and **A** → 9,5 correspond to the setting values 4 and 9.5 on the setting knob **A**. The operating point (settable with setting knob **B**) is to be located for usual heating modes halfway between the largest required and the least possible heating flow temperature.

Setting knob A	2	4	6	8	10	12	14	16	18	20
Xp 100 in %	2	4	6	8	10	12	14	16	18	20
Xp 70 in °C	1.4	2.8	4.2	5.5	7.0	8.2	9.6	10.9	12.4	13.9
Xp 30 in °C	0.6	1.2	1.9	2.4	2.8	3.4	4.0	4.7	5.2	6.0
Xp 20 in °C	0.4	0.8	1.2	1.6	2.0	2.2	2.6	3.2	3.6	4.0

Setting of the operating point: Setting knob **B**

With setting knob **B** the operating point of the operating characteristic point can be moved. The corresponding scale is planned in “°C flow temperature” or “% valve position”. Basically, the operating point is to be moved with setting knob **B** to the middle of the system’s operating range. It is for example 45 °C for a heating system in which the execution value matches the standard

design value and which at the lowest outdoor temperature requires a maximum heating water temperature of approx. 70 °C and a minimum temperature of approx. 20 °C. Experience shows that most systems are quite oversized. For the usual 70/50 radiator heating systems, the basic setting **B** → 45 (instead of 50 °C) is correct.

Night decrease: Setting knob **C**

On setting knob **C** the size of the reduction to be triggered by the timer is to be set. The setting of **C** gives a parallel shift of the operating characteristic curve to the left (see dotted curve II). This leads to a decrease in the room temperature. The scale division of **C** corresponds to a room temperature decrease of approx. K (°C). “0” means no decrease.

Example: **C** → -8 means that the nighttime room temperature target value is lower by 8 K compared to the daytime value, so that the room temperature at night can decrease to approx. 8 K below the set daytime temperature and hence
e. g. to 12 °C ($20\text{ °C} - 8\text{ K} = 12\text{ °C}$).

The recommended setting **C** at -8 makes it possible to save quite a lot of energy with a large nighttime decrease. In some buildings the rooms may become too cold.

In these cases, it is recommended to set a night decrease value of about -5 or to switch on day mode earlier.

Examples with other operating ranges:

■ 1) Low temperature heating

maximum flow temperature 50 °C,

minimum flow temperature 20 °C,

average operating temperature $(50 + 20) : 2 = 35$ °C;

The operating point of the operating characteristic curve is to be set at 35 °C.

B → 35

A → 5

■ 2) Ventilation and air conditioning systems:

maximum supply temperature 40 °C

minimum supply temperature 20 °C

average operating temperature $(40 + 20) : 2 = 30$ °C

The operating point of the operating characteristic curve is to be set at 30 °C.

B → 30

A → 10

■ 3) Mixing chamber:

Valve setting AL 100 %, AL at

valve setting AL 0 %, AL to

B → 50

A → 8

(**S1** → K, **S2** → 1)

When using separated temperature sensors and target value setting devices (TW 21...23), the function selector on the back of the control unit **S2** is to be set always on **1**. These target value setting devices are gaged in °C.

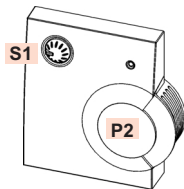
Remote Control TF 22 (optional)

Setting the Room Temperature

On setting knob **P2** the setting of the room temperature can be fine-tuned. The normal setting is the room temperature set on control unit (setting knob **B**) (mainly 20 °C to 22 °C, the room temperature is not measured on the temperature selector). The scale on the selector is divided from -7 to +7 and corresponds more or less to the variation in degrees.

- + → Increasing the Room Temperature
- → Lowering the Room Temperature

The functioning of the selector knob **P2** corresponds to the functioning of the setting knob **B** on the control unit and gives a parallel displacement of the heating curve along the oblique room temperature axis indicated in the diagram. The values on the selector knob **P2** and the setting knob **B** are added on the control unit:



Examples	B → 0				B → +1			
Selector knob P2	-1	0	+1	+2	-1	0	+1	+2
Room temp. [°C]	19	20	21	22	20	21	22	23

If no temperature selector is available, the desired room temperature can be set only on the setting knob **B** of the control unit.

Party switch **S1**

The temperature selector's party switch has the following settings:

auto automatic change to day mode or reduced mode according to the timer



manual day mode, timer not active



manual night mode, timer not active
(the “night” duration mode is possible only if the hours are set.)

If, for example, the heating is to stay open longer, the Partyswitch is to be set on manual day mode. Do not forget to switch back if the automatic mode is to be activated again later on.

Instructions for the Technician (only!)

Removing the Timer (see also the install. instructions)

Operating steps:

1. Pull out the instructions case.
2. Hold the timer by the two white stems and turn to the left until the connector is released.
3. Remove the timer.
(To install the timer proceed in the opposite order.)

Regulation Stability (Sensitivity)

The stability of the regulation can be modified with the setting potentiometer **P1**.

For the regulation technician:

By means of **P1** set the proportional range of the PD control unit. Recommended basic setting: **P1** → 10.

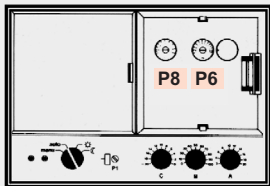
In case of unstable regulation, set higher values.

Setting potentiometer (for special cases)

- Below the timer you will find the two potentiometers **P6** and **P8** (see fig.). After removing the timer these can be set with a screwdriver. The factory basic setting is correct in most cases and needs to be reset only in special cases and only by a technician.

■ Potentiometer P6 : Minimum limit

In case of air-handling systems minimum outside air rates or minimum flow temperatures are necessary. P6 determines the minimum opening of the setting valves between 0...70 %. For heating systems minimum flow temperatures of 0...70 °C can be set.



Factory basic setting: P6 → 0

■ Potentiometer P8 : Feedback balancing

In heating systems without flow sensor (e. g. quantity regulation in the flow) or in air-handling systems, the control unit works with a potentiometer feedback of the servomotor. Changes in special cases, if e. g. with valve actuation the motor's switch-off point and the valve's cut-off point do not match.

Factory basic setting: P8 → 0

Changes are to be made only by specialized personnel!

Make sure that:

1. Shifting towards + the closing angle increases
 - the regulating unit is closed further
2. Shifting towards – increases the opening angle
 - the regulating unit is opened further

Function switch **S1** / **S2**

(**S1** and **S2** are located on the back of the controller insert. To move the function switch insert, remove it as described in the installation instructions.)

■ Function switch **S1** "Heating – Cooling"

In air-conditioning systems, the controller can be used also to regulate the cooling load. The feedback of the setting value (valve position) to the controller is provided by means of a potentiometer in the servomotor, instead of the flow sensor.

S1 → **H** (Heating) = factory basic setting

S1 → **K** (Cooling)

In setting **K** the following mean:

LED display **red** – colder (greater cooling load)

LED display **green** – hotter (less cooling load)

■ Function switch **S2** "Target Value Definition"

S2 → **2** (target value in the pro. range, like setting knob **B**)
= factory basic setting

S2 → **1** (Operating point is always at the target value)

Position **1** of the switch is appropriate for example for mixing chamber or greenhouse regulations. With this setting the entire operating characteristic curve goes only in one direction.
Position the setting knob **B** always on **50**.



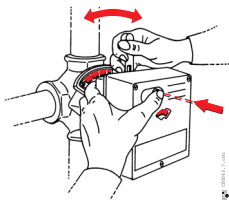
Troubleshooting Checklist

- Is the heat generator at the required temperature?
→ Read the heat generator's thermometer.
- Is the burner ready?
Is the burner failure lamp on?
→ If necessary, press the suppressor.
- Was the temperature selector set by mistake?
Setting of the selector knob **P1**
- Check the setting on the control unit.
Setting knobs **B** **C** and operating mode selector **S**.
- Is the timer running? Is the displayed time correct?
→ Check the time and switch-on point.

If the problem still has not been solved after checking the settings, position the setting knob **B** on **+7**

The servomotor should now open the mixing valve and the **red** LED **L2** should light up. If this is not the case, the control system has failed. Contact your heating technician.

Manual mode



In case of the breakdown of the heating mode regulation you can proceed **temporarily** as follows:

1. Set the operating mode selector **S** on **manu**.
2. Open the mixing valve by hand until the desired flow and room temperatures are reached.

- The coupling incorporated in the mixing valve drive unit provides for the release of the connection between the motor and the mixing valve.
- Press firmly on the unlock key on the cover of the drive unit and keep the key pressed (firmly!).
- Use the setting lever to set the mixing valve in the desired position.

After eliminating the problem the mixing valve is set again to the right position by the control unit in automatic mode.

Reference

Installation instructions

Compact Control Units ZG 215N / 215 VN / 252 N

EN 1H-0181 GE51

Operating Instructions

ZG 252N: EN-2H0215 GE51

ZG 215N: EN-2H0216 GE51

ZG 215V: EN-2H0217 GE51

“Informationsschrift”(Planning brochure in German)

L3 – Komfort-Compact Regler

GE-0H 0327 GE51

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Technical data may be changed without prior notice.

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