SIEMENS

3334

Synco™ 100

Immersion Temperature Controller RLE132

with 3-position output

Immersion temperature controller for basic heating plants. Compact design with 3-position control. Used as a controller, minimum or maximum limiter.

Use

Plant types:
- Heating zones in heating plants
- Heating section of ventilation or air conditioning plants
- Flow temperature in heating plants
- DHW temperature
- Heat exchanger control
- Calorifier control

Building types:
- Residential buildings of all types
- Non-residential buildings of all types

Used as a limiter:
- Heating plants controlled by a heating controller with 3-position control, e.g. RVL47…, RVP3…, RVP2…

Devices that can be controlled:
- Actuators with 3-position control

Functions

Main functions

- Control of the water temperature through 3-position control of a seat or slipper valve
- Minimum or maximum limitation of the flow or return temperature, or minimum limitation of the boiler return temperature

Other functions

- Outside temperature compensation
- Remote setpoint adjustment
- Setpoint changeover via external contact, can be selected to provide temperature setback or legionella function
- Frost protection
- Load-dependent switching contact (e.g. for pump release)
- Test mode as a commissioning aid

Ordering

When ordering, please give type reference **RLE132**.

Equipment combinations

Actuators must meet the following specification:

- 3-position control
- Control contacts suited for AC 24…230 V, 2 A
- Running times:
  - ≥30 s (30 s or 35 s)
  - ≥120 s (120 s, 125 s, 135 s, 150 s or 160 s)

For auxiliary functions, the following products can be used:

Type of unit	*Type ref.*	*Data Sheet*
Outside sensor (for outside temperature compensation)	**QAC22**	N1811
Remote setpoint adjuster	**BSG21.1**	N1991
Scale 0…130 °C for remote setpoint adjuster	**BSG-Z**	N1991

As a limiter, the RLE132 can be used in connection with the following types of heating controllers:

Type reference	*Data Sheet*
RVL470	N2522
RVL471	N2524
RVL472	N2526
RVP200, RVP210	N2462
RVP300	N2474
RVP310	N2475
RVP320	N2476
RVP330	N2477
RVP331	N2478

Technical design

Mode of operation as a controller

When the water temperature deviates from the setpoint, the controller adjusts the actuating device until the setpoint is reached again. The neutral zone is ±2 K. The controller calculates and stores the running time of the connected actuator. Fully open (100 %) corresponds to a heat demand of 100 % (also refer to section “Switching contact”).
The controller provides 2 modes of operation (for details refer to section “Operating modes“):

- Control with ECO
- Control with boost

The following settings are required:

- Setpoint
- Control mode: A choice of 4 PI modes are available to suit the type of controlled system (refer to chapter “Mechanical design”)
- P-band

Mode of operation as a limiter

The control signals of the heating zone controller (RVL47…, RVP3…, RVP2…) are passed to the RLE132 which acts as a limiter.

Minimum limitation

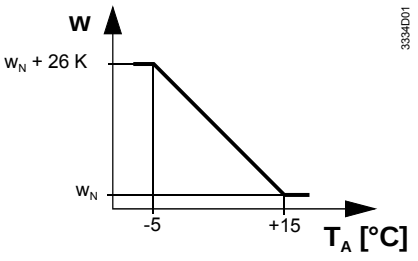
1. If the temperature (e.g. the boiler return temperature) falls to a level 4 K above the minimum limit value, the RLE132 interrupts the OPEN signals of the heating zone controller. At the same time, it delivers CLOSE commands in the form of pulses to the mixing valve’s actuator until the temperature rises again.
2. If the temperature falls to the minimum limit value, the RLE132 delivers a constant CLOSE command to the mixing valve’s actuator until the temperature rises again.
3. If the temperature rises, the RLE132 releases the positioning commands of the heating zone controller.

Maximum limitation

1. If the temperature (e.g. the flow temperature) rises to a level 4 K below the maximum limit value, the RLE132 interrupts the OPEN signals of the heating zone controller. At the same time, it delivers CLOSE commands to the mixing valve’s actuator in the form of pulses until the temperature falls again.
2. If the temperature reaches the maximum limit value, the RLE132 delivers a constant CLOSE command to the mixing valve’s actuator until the temperature falls again.
3. If the temperature falls, the RLE132 releases the positioning commands of the heating zone controller.

Outside temperature compensation

When using an outside sensor, the RLE132 provides outside temperature compensation. If the outside temperature falls from +15 to –5 °C, the setpoint will be continuously raised by 0 K to 26 K. Below an outside temperature of –5 °C, the temperature increase will be kept constant.



T_A Outside temperature
w Current setpoint
w_N Nominal setpoint

Remote adjustment of setpoint

Where the controller is mounted in an inaccessible location, a remote setpoint adjuster BSG21.1 can be connected to the RLE132 (terminals R1–M), thus enabling the setpoint to be adjusted from a remote location. In this case, the controller’s setpoint setting slider must be set to EXT.

Operating modes

Control with ECO (setpoint decrease)

In operating mode **Control with ECO**, the nominal setpoint is **reduced** by closing an external potential-free contact across terminals D1–M.
This ensures energy savings, e.g. through night setback of space heating controlled by a time switch.

Control with boost (setpoint increase)

In operating mode **Control with boost**, the nominal setpoint is **raised** by closing an external potential-free contact across terminals D1–M.

This makes possible legionella protection in DHW heating systems. With the help of a 7-day time switch, the DHW is periodically heated up to the required temperature.

Setting

A slider is provided to set the temperature by which the nominal setpoint shall be lowered (ECO) or raised (boost). The setting cannot be accessed by the user.

Switching contact

The switching output (terminals Q13–Q14) enables a plant element to be switched depending on demand, or a limitation alarm to be generated. The mode of operation depends on the operating mode selected on the RLE132:

- When used as a **controller**:
  The switching contact makes when there is a heat demand of 5 %. The contact breaks, when there is no demand (0 %) for a period of 12 minutes.
- When used as a **limiter**:
  The contact makes when the limitation value is reached, and breaks when normal operation is resumed.

Test mode

In test mode, the control is switched off. The setpoint setting knob acts as a positioning unit:

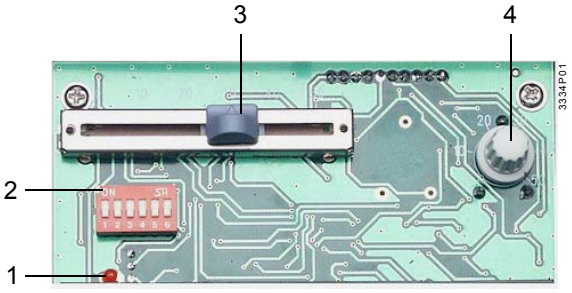
- If a setting >104 °C is used, the actuating device will open (OPEN command on Y1)
- If a setting <26 °C is used, the actuating device will close (CLOSE command on Y2)

The test mode is indicated by an LED.

Mechanical design

The controller is designed for mounting into piping. It consists of a housing and cover and an immersion rod. The rod contains the sensing element (LG-Ni 1000).
The housing is made of plastic and accommodates the controller electronics and all operating elements, which are accessible only after removing the cover. The front carries the setpoint setting slider and an LED for indicating operation:

- LED lit: normal operation
- LED flashes: test mode



1 LED
2 Block of DIP-switches
3 Setting slider for the setpoint increase or decrease
4 Setting potentiometer for the P-band

All functions are selected via the DIP switch block which comprises 6 switches:

Function	1	2	3	4	5	6	Action
Operating	■	■					Heating with boost; setpoint increase
	■	□					Maximum limitation
	□	■					Minimum limitation
	□	□					Heating with ECO; setpoint decrease
Integral action time			■	■			VERY SLOW, T_N = 300 s
			■	□			SLOW, T_N = 180 s
			□	■			FAST, T_N = 60 s
			□	□			MEDIUM, T_N = 120 s
Test mode					■		Test mode
					□		Normal operation
Running time of actuator						■	≥30 s
						□	≥120 s

For mounting, a protection pocket is provided; the controller is inserted and snaps on.

Engineering notes

The controller is supplied complete with Mounting and Installation Instructions.

Mounting notes

Ensure that the local safety regulations are complied with.
Suitable mounting locations are the following, depending on the application:

- Flow temperature control:
  - In the heating flow; immediately after the pump if the pump is mounted in the flow
  - In the heating flow; approximately 1.5 to 2 m after the mixing point if the pump is mounted in the return
- Minimum limitation of the boiler return temperature and maximum limitation of the flow temperature:
  1.5 to 2 m after the mixing point
- DHW temperature control:
  1.5 to 2 m after the mixing point
- Heat exchanger control:
  As close as possible to the heat exchanger while observing the maximum permissible ambient temperature

To mount the protection pocket, a threaded sleeve must be fitted into the pipe. The immersion rod should face the direction of flow. The maximum permissible ambient temperature must be observed.

Commissioning notes

To check the control wiring, the controller can be switched into test mode so that the response of the actuating device can be checked.
In case of instability of the control loop, the P-band is to be increased, and/or the integral action time selection. If the response of the system is too slow, these values are to be reduced.

Technical data

Power Supply	Operating voltage	AC 230 V +10% / –15%
	Frequency	50 / 60 Hz
	Power consumption	max. 4 VA
Functional Data	Setting range nominal setpoint	0…130 °C
	Setting range setpoint changeover	0…50 K
	P-band	1…50 K
	Integral action time with PI control	selectable (60 / 120 / 180 / 300 s)
	Control outputs Y1, Y2	
	Voltage	AC 24…230 V
	Current	max. 2 A
	Control outputs Q13–Q14	
	Voltage	AC 24…230 V
	Current	max. 2 A
	Max. cable length copper cable 1.5 mm^2	
	For signal input B9	80 m
	For switching input D1	80 m
	Contact sensing (input D1–M)	DC 6…15 V, 3…6 mA

Environmental conditions

Operation	
Climatic conditions	to IEC 721-3-3, class 3K5
Temperature	0…+50 °C
Humidity	<95 % r.h.
Transport	
Climatic conditions	to IEC 721-3-2, class 2K3
Temperature	−25…+70 °C
Humidity	<95 % r.h.
Mechanical conditions	class 2M2

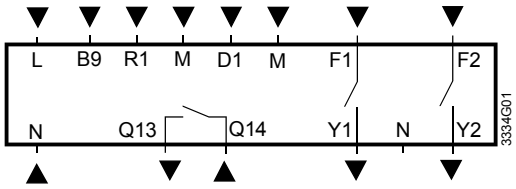
Norms and standards

CE conformity according to	
EMC directives	89/336/EEC
Low voltage directives	73/23/EEC and 93/68/EEC
Product standards	
Automatic electrical controls for household and similar use	EN 60 730-1 and EN 60 730-2-9
Electromagnetic compatibility	
Emissions	EN 50 081-1
Immunity	EN 50 082-1
Degree of protection	IP 42 EN 60 529
Safety class	II to EN 60 730
Degree of contamination	normal

General

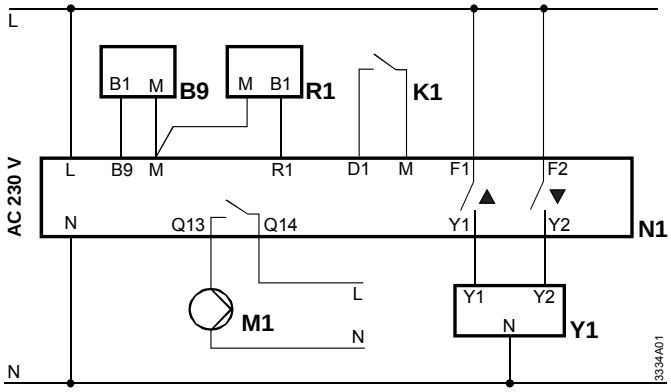
Connection terminals for solid wires or stranded wires	2 × 1.5 mm^2 or 1 × 2.5 mm^2
Sensor	
Sensing element	LG-Ni 1000 Ω at 0 °C
Time constant (with protection pocket)	25 s
Protection pocket	
Immersion depth	150 mm
Perm. nominal pressure	PN10
Made of	brass (Ms63)
Weight	0.3 kg

Connection terminals

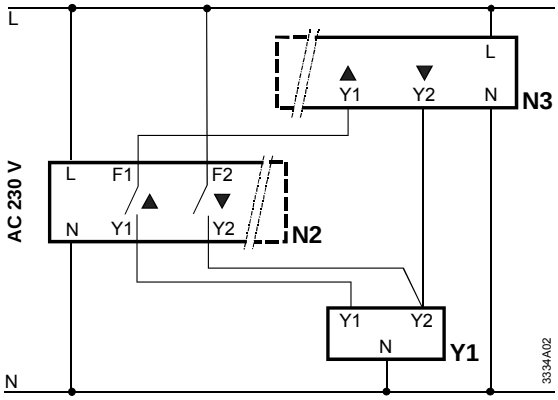


B9	Outside sensor
D1	Input for setpoint changeover
F1	Input for Y1
F2	Input for Y2
L, N	Operating voltage AC 230 V
M	Ground
R1	Input for remote setpoint adjuster
Q13, Q14	Switching contact
Y1	Control output for mixing valve OPEN
Y2	Control output for mixing valve CLOSED

Connection diagram



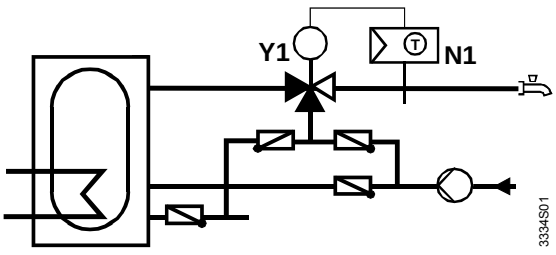
Used as a controller, flow temperature with outside temperature compensation, remote setting unit, setpoint changeover and demand control of a pump



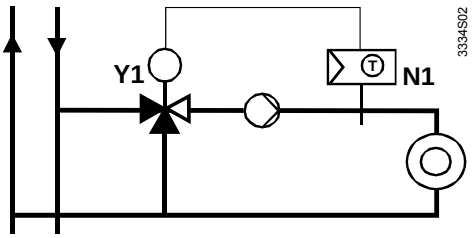
Used as a limiter in connection with a heating zone controller (RVL47…, RVP3…, RVP2…), e.g. minimum limitation of the boiler return temperature or maximum limitation of the boiler flow temperature

B9 Outside sensor QAC22
K1 External contact (e.g. time switch)
M1 Pump
N1 Immersion temperature controller RLE132
N2 Immersion temperature controller RLE132 as a limiter
N3 Heating controller RVL47…, RVP3…, RVP2…
R1 Remote setpoint adjuster BSG21.1
Y1 Actuator of heating circuit valve

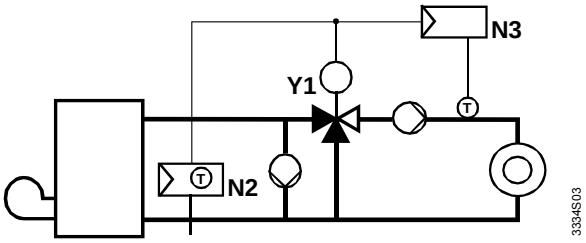
Application examples



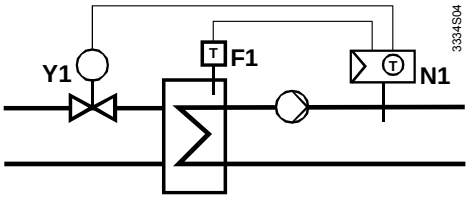
DHW temperature control



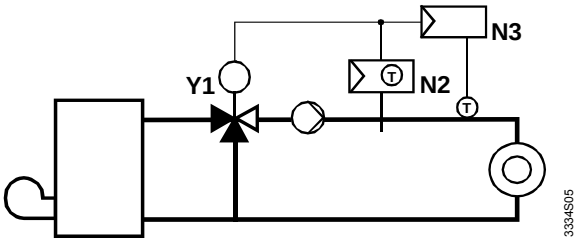
Flow temperature control in a heating zone with a common flow



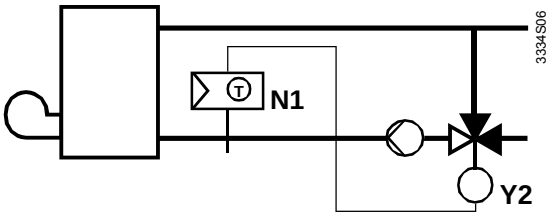
Control of a heating zone with zone controller RV…, minimum limitation of the boiler return temperature with RLE132



Heat exchanger control with 2-port valve in the primary flow



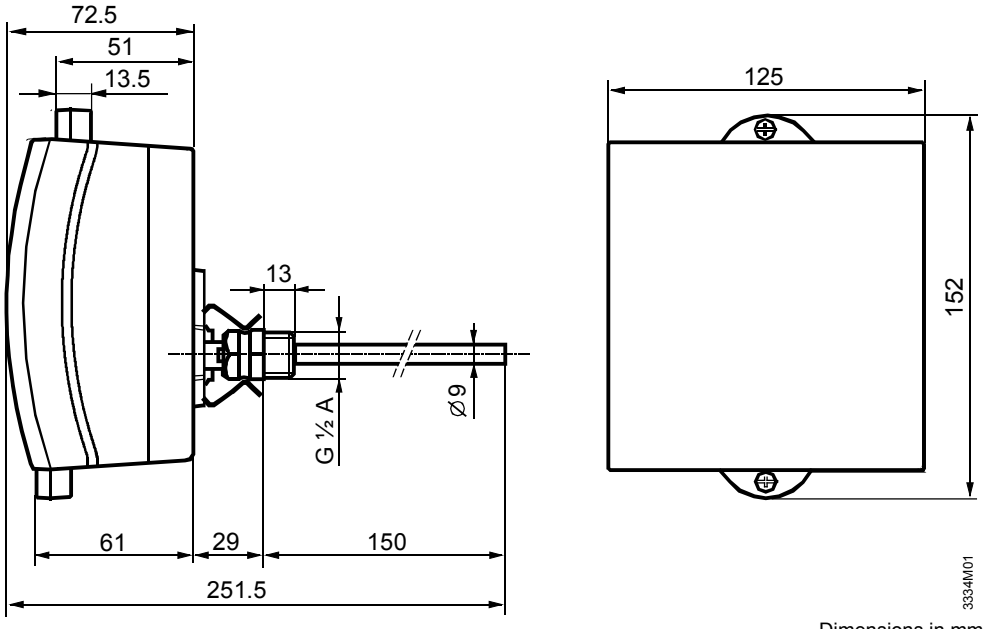
Control of a heating zone with zone controller RV…, maximum limitation of the flow temperature with RLE132



Control of the boiler return temperature

F1 Safety limit thermostat
N1 Immersion temperature controller RLE132 as a controller
N2 Immersion temperature controller RLE132 as a limiter
N3 Heating zone controller RVL47…, RVP3…, RVP2…
Y1 Heating circuit mixing valve or primary circuit valve or DHW mixing valve
Y2 Mixing valve, boiler return circuit

Dimensions



Controller with protection pocket

Dimensions in mm