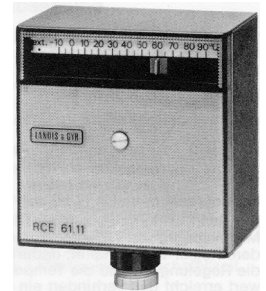


POLYGYR®-Compact

Immersion Temperature Controller

RCE61.11

with one output for heating or cooling,
continuous, PI control, electronic, 24 V a.c.



Application

The RCE61.11 is used for the control and limiting of temperatures in hot and chilled water installations.

Application examples:

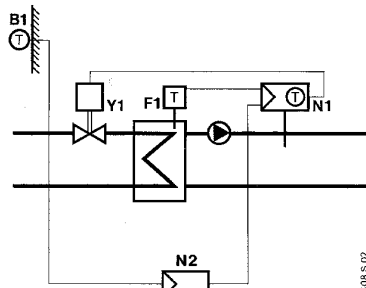
- On the water side of ventilating and air conditioning installations
- Closed circuit heat exchangers
- Heating installations
- Domestic hot water installations

It provides both high and low limiting of the temperature if used as a limiter.

The RCE61.11 controls the electro-thermal or electro-hydraulic actuator of the heating or cooling valve.

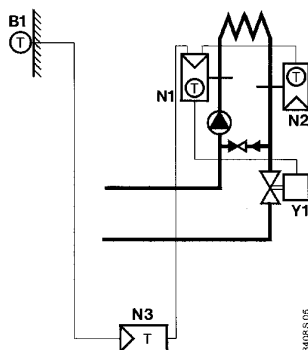
The temperature controlled by the RCE61.11 can be shifted.

Control of a heat exchanger, shifted according to the outdoor temperature



- N1 RCE61.11 immersion temperature controller
- N2 RZF61.10 shift controller
- B1 QAC21 outside detector
- F1 Safety limit thermostat
- Y1 Valve with actuator (primary circuit)

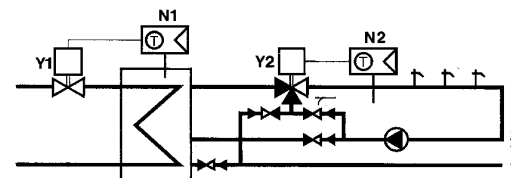
Flow temperature control with high limiting of the return temperature in a district heating system, shifted according to the outdoor temperature



- N1 RCE61.11 immersion temperature controller (heating zone)
- N2 RCE61.11 immersion temperature controller (used as a high limiter)
- N3 RZF61.100 shift controller
- B1 QAC21 outside detector
- Y1 Valve with actuator

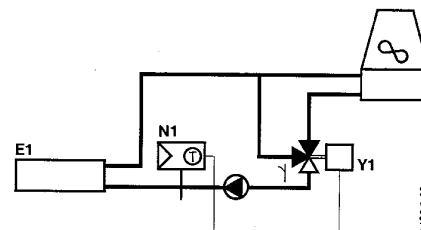
Control of domestic hot water temperature

Note: When selecting the required actuators, section «Application Advice» must strictly be observed.



- N1 RCE61.11 immersion temperature controller (in primary circuit, heat exchanger)
- N2 RCE61.11 immersion temperature controller (in domestic hot water flow)
- Y1 Valve with actuator (primary circuit)
- Y2 Valve with SKD62 actuator (mixing of domestic hot water)

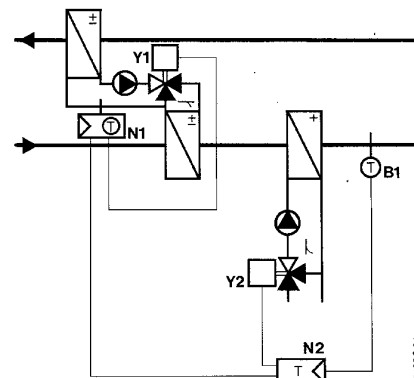
Control of chilled water temperature for refrigeration machine



- E1 Condenser
- N1 RCE61.11 immersion temperature controller
- Y1 Valve with actuator (chilled water)

Frost protection of heat recovery system with closed circuit heat exchanger

Note: See also «Wiring Diagrams»

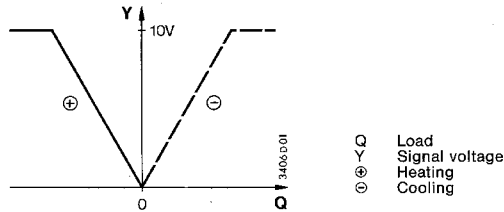


- N1 RCE61.11 immersion temperature controller (used as a low limiter)
- N2 RWF61.20 universal controller (main control loop)
- B1 QAM21 duct temperature detector (main control loop)
- Y1 Valve with actuator (heat exchanger circuit)
- Y2 Valve with actuator (air heater battery)

Function

As a controller

The RCE61.11 provides PI control. Its proportional band is adjustable and three different integral action times can be selected. It compares the actual value with the setpoint and generates the corresponding control signal. The control signal is continuous and has a range of 0...10V d.c. When the control signal changes from 0...10V, the correcting variable changes from 0...100%, i.e. there is a proportional relationship between the correcting variable and the control signal. The mode of operation of the control signal can be adjusted:



As a limiter

The RCE61.11 can be used as a high or low limiter. Its control signal is fed to the temperature controller. This means that the limiter takes over the control function when the selected limit value is reached, thus preventing a further increase or decrease of the water temperature.

Compensation

The reference value is fed to the controller, thereby shifting the setpoint. There are two possibilities:

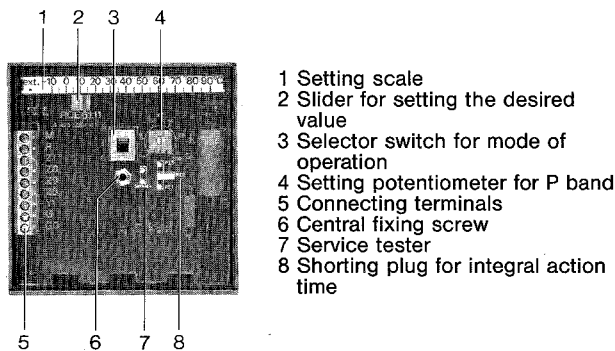
- Universal compensation over the whole setting range or over any part of the setting range with the help of the RZF61.100 universal shift controller (see Data Sheet 3472), or from a building automation system
- Setpoint adjustment within $\pm 10\%$ of the setting range; this is generally made from a building automation system

For more information on compensation refer to Data Sheet 3401 (Basic System Data) and «Application Advice».

Design Features

The RCE61.11 is an electronic controller of compact design with the electronics, setting unit and sensing element combined in one unit.

The RCE61.11 is housed in a plastic case with removable cover. The immersion detector stem with the nickel measuring element is fitted to the rear of the unit. All setting devices and connecting terminals are contained in the case and are accessible only when the cover is removed.



The scale and the slider for setting the desired temperature can be seen through a window in the cover. The cable entries in the form of knockout holes (Pg11) are at the bottom. To facilitate mounting in the pipework, the controller is provided with a male thread and a fixing nut (standard version). Immersion detector stem, threaded bushing and fixing nut are made of corrosion-proof steel. The latter provide proper metallic insulation so that a protection pocket is not required (but also refer to «Accessories»). The controller must not be removed from the pipework should servicing be required. Two printed circuit boards carry the controller electronics and the setting devices. They can be removed from the case after the cables have been disconnected and the central fixing screw loosened.

Accessories

- If required, a protection pocket for use with the RCE61.11 can be supplied.
- Protection pocket PN10, nickel plated brass **4 660 1893 0**
 - Protection pocket PN16, St18/8/2,5 CrNiMo **4 660 1799 0**

Combination of Units

Controllable units

The regulating units controlled by the RCE61.11 must have the following characteristics:

- Type of control 10 V d.c.
- Operating voltage 24 V a.c.

Remote setting unit

The FZA21.11-t90 remote setting unit (see Data Sheet 3470) is used for the remote setting of the desired value.

Technical Data

Operating voltage	24 V a.c. $\pm 20\%$
Frequency	50...60 Hz
Power consumption	1 VA
Control signal	
Voltage	0...10 V d.c., continuous
Current	1 mA
Integral action times (selectable)	
PI1	10 s
PI2	60 s
PI3	120 s
Measuring element	Ni 1000 Ω at 0°C
Time constant of detector	
Standard version	4 s
With protection pocket	25 s
Setting ranges	
Setpoint	-10...+90°C
Proportional band Xp	7...100% ($\neq 7...100$ K)
Permissible nominal pressure	PN16
Protection standard of housing	IP30 to DIN 40050
Radio interference protection	N to VDE 0875, §4
Permissible ambient temp.	
Operation	-10...+50°C
Transport and storage	-25...+65°C
Permissible ambient humidity	
Operation	G to DIN 40040
Transport and storage	F to DIN 40040
Vibration test	with 2 g, to DIN 40046, Sheet 8
Cable entry glands	Pg11
Connecting terminals	for 2 x 1,5 mm ² or 1 x 2,5 mm ²
Weight	0,250 kg

Ordering Specification

When ordering please use type reference: **RCE61.11**

The protection pocket, if required, must be ordered separately (see «Accessories»).

Application Advice

Data Sheet 3401 contains basic system data on POLYGYR. All hints and explanations given in this sheet must be observed. When the unit is switched off or the power supply interrupted (terminal G), the regulating unit is automatically run to the closed or no-load position.

A transformer is required to generate the operating voltage of 24 V a.c. When several units are connected, the size of the transformer is determined by adding up the power consumption of the individual units. For the connecting terminals and their designations refer to «Wiring Diagrams».

If the controller is used with a protection pocket, the time constant of the detector increases significantly.

Actuators

For the permissible lengths of leads between the controller and the actuator refer to Data Sheet 3401 (Basic System Data). The RCE61.11 can control up to 10 actuators in parallel operation. Actuator type **SKD62** or **SQX61** must always be used in the following applications:

- Control of heat exchangers with small water content
- Control of domestic hot water temperature (mixing valve for domestic hot water)

Compensation

If a compensation input is used, attention must be paid to its input signal:

Terminal Z1: Input for universal compensation. The signal +5 V ± 10 V corresponds to $\pm 100\%$ of the setting range (for more information refer to Data Sheet 3472)

Terminal Z3: Input for setpoint adjustment (fixed value shift) from a building automation system. The signal +5 V ± 5 V corresponds to $\pm 10\%$ of the setting range

Limiting

If the RCE61.11 is used as a limiter, its mode of operation and the electrical connections must be selected according to the table below, depending on the required control and limit function:

Function	Controller		Limiter RCE61.11		Connections	
	Type of controller	Mode of operation (switch)	Function	Mode of operation (switch)	from controller terminal	to limiter terminal
Heating	RCE61.11	⊕	low	⊕	Z9	Y1
Heating	RCE61.11	⊕	high	⊖	Z8	Y1
Cooling	RCE61.11	⊖	low	⊕	Z8	Y1
Cooling	RCE61.11	⊖	high	⊖	Z9	Y1
Heat recovery	RWF61.20	⊖	low*	⊖	Y2	Z8
Heat recovery	RWF61.30	S3 ⊖ S4 ⊕	low*	⊖	Y3	Z8

* Frost protection (see example under «Application»)

Mounting Advice

Mounting locations:

With flow temperature control:

- In heating flow immediately after the pump if pump is mounted in the flow
- In heating flow approx. 1,5...2 m after the mixing valve or mixing point if pump is mounted in the return

With return temperature control:

- Approx. 1...1,5 m after the mixing point

With heat exchanger control:

- As close as possible to the heat exchanger with consideration for the permissible ambient temperature

Mounting:

A threaded fitting is required to mount the controller in the pipework. Where possible, the fitting should be welded in a pipe bend so that the immersion detector stem (or the protection pocket) faces the flow of water. The controller must be mounted at the side of the pipe if the warm air rising from the pipework could cause the temperature of the unit to exceed +50°C.

For detailed mounting instructions refer to the general instructions G 3408 supplied with the unit.

Commissioning Advice

The required mode of operation which must be selected according to the application is shown in the table under «Application Advice». To check the operation, P control can be provided with the aid of the service plug. The correct operation of the regulating unit can be examined by setting the slider to its limit positions.

With domestic hot water temperature control (mixing of domestic hot water), the selected integral action time must be 10 s (plug position Pl 1). The factory-adjusted integral action time of 60 s (plug position Pl 2) and P band Xp give good control results for all other applications. If readjustment is required, the following must be noted:

- In case of instability: Xp must be increased
- In case of instability with Xp set to maximum value: Integral action time must be increased
- In case of overstability: Xp must be decreased

If auxiliary control functions (e.g. limitation, compensation) are fed to the main controller, the controlled value must first be adjusted with no influence from the auxiliary control functions. The auxiliary values are adjusted only after the controlled value has been adjusted.

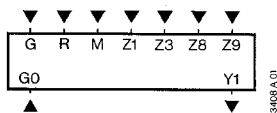
If a remote setting unit is used, the slider for setting the desired temperature must be set to «ext».

For detailed commissioning instructions refer to G 3408.

Wiring Diagrams

The following wiring diagrams only show the fundamental layout. They do not contain the switch off functions and other switching functions which can vary from one plant to the other according to the operating conditions.

Connecting terminals

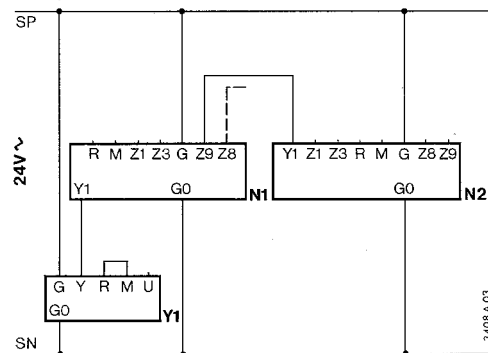


G, G0 Operating voltage 24 V~
 G System potential (SP)
 G0 System neutral (SN)
 M Measuring neutral
 R Setpoint signal
 Z1 Reference signal +5 V ±10 V
 Z3 Reference signal +5 V ±5 V
 Z8 Limiting signal 0...10 V d.c. (input)
 Z9 Limiting signal 0...10 V d.c. (input)
 Y1 Control and limiting signal 0...10 V d.c. (output)

Temperature control with limitation

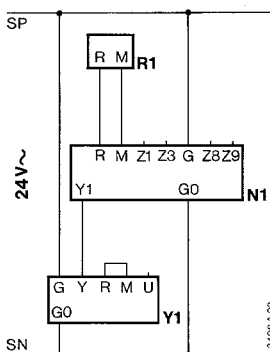
Mode of operation of controller: Heating

Function of limiter: Low limiting (high limiting shown in broken lines)



N1 RCE61.11 immersion temperature controller (used as a main controller)
 N2 RCE61.11 immersion temperature controller (used as a limiter)
 Y1 Actuator

Basic connections



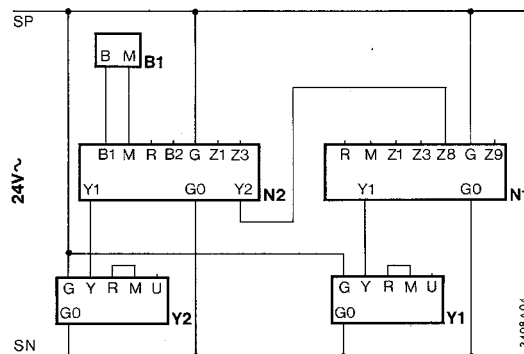
N1 RCE61.11 immersion temperature controller
 R1 FZA21.11-t90 remote setting unit
 Y1 Actuator

Frost protection of a closed circuit heat exchanger

Mode of operation of controller: Cooling

Mode of operation of limiter: Low limiting

Refer to «Application» for schematic diagram



B1 QAM21 duct temperature detector (main control loop)
 N1 RCE61.11 immersion temperature controller (used as a limiter)
 N2 RWF61.20 universal controller (main control loop)
 Y1 Actuator (heat exchanger circuit)
 Y2 Actuator (air heater battery)

Dimensions

