

- variable controller for circulation systems
- demand-oriented pump control
- easy-to-install housing
- user-friendly operation
- intuitive menu operation via push buttons

Technical data

RESOL EC1

Housing: plastic, PC-ABS and PMMA

Dimensions: 172 x 110 x 46 mm

Protection type: IP 20/EN 60529

Protection class: II

Ambient temp.: 0 ... 40 °C

Display: LCD, multi-functional display,
combined display

Controller adjustment: menu-operated

Inputs: 1 sensor input for flow switch



The purpose of a circulation system is to provide the user with hot water as quick as possible when opening the tap. The pipe line system for supplying with domestic hot water is simultaneously used as a circulation system so that by means of the circulating pump, water is passed through the water pipes even without having to open the tap.

There are different solution possibilities:

- 24 h operation of the circulating pump
- time-controlled operation of the circulating pump
- time and thermally controlled operation of the circulating pump

The solution possibilities mentioned are not optimally adjustable and will cause unnecessary energy consumption.

Our solution:

Via a flow switch in the hot water pipe, the controller unit controls the water draw-off. After opening the tap for a brief moment, the circulating pump is switched on and will be switched off again after the adjusted runtime. The tap functions like a "remote control". This circulating pump control function is an eco-friendly and energy-saving solution in line with demand.



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Important note

The texts and drawings in this manual are correct to the best of our knowledge. As faults can never be excluded, please note: Your own calculations and plans, under consideration of the current standards and directions should only be basis for your projects. We do not offer a guarantee for the completeness of the drawings and texts of this manual - they only represent some examples. They can only be used at your own risk. No liability is assumed for incorrect, incomplete or false information and / or the resulting damages.

Note

The design and the specifications can be changed without notice. The illustrations may differ from the original product.

Imprint

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Subject to technical change. Errors excepted.

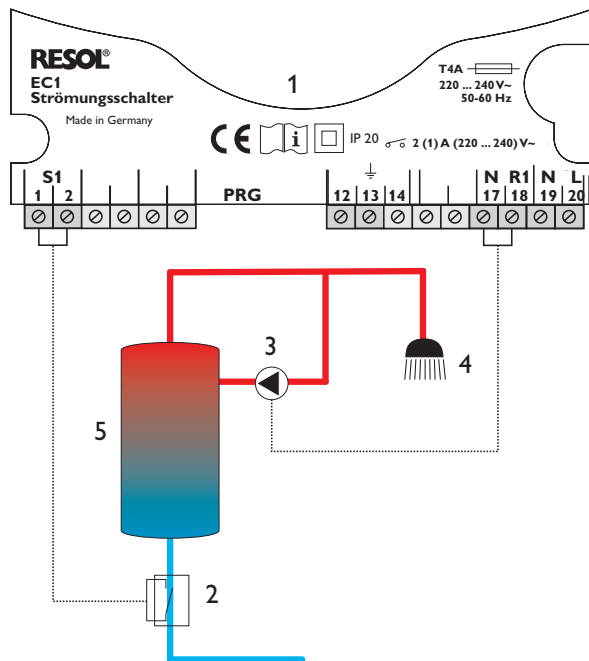
Security advice

Please carefully read the manual for mounting and installation before commissioning the controller. In this way damages to the system can be avoided. Please also note that the installation must be adapted to the conditions provided by the customer. The installation and operation must be executed according to the approved technical regulations. The regulations for prevention of industrial accidents of industrial injuries corporations must be observed. The improper use as well as the incorrect modification of installation and construction result in the exclusion of any kind of liability. The following technical rules must especially be considered:

TRD 802	Steamboiler of group III, or
TRD 402	Steamboilers with boilers of group IV
DIN 1988, part 1 – 8	Technical reg. for domestic water installation
DIN 4708, part 3	Central water heating systems
DIN 4751, part 1 + 2	Water heating systems
DIN 4753	Water warmer and systems for domestic water

DIN 4757, part 1 – 4	Solar heating - and solar thermal systems
DIN 18338	Roof covering and sealing
DIN 18339	Pumping
DIN 18451	Framework
VDE 0100	Instal. of electrical equipment
VDE 0185	General instruction for lightning protection systems
VDE 0190	Main potential equalisation electric systems
DIN 18381	Gas-, water- and waste water installation systems
DIN 18382	Electrical cable - and pipeline systems in buildings
HeizAnIV	Heating system regulation

1. General function description



The flow switch (2) built into the store inlet reacts to the water flow when the tap is being opened (4). Before actually drawing off water, open the tap for a brief moment. After that, the control unit (1) puts the circulating pump into operation (3) in order to let the hot water flow from the store (5) through the circulation line. When you open the tap again, hot water will arrive there within a few seconds. The control unit will now switch off the circulating pump again after the adjusted runtime in order to prevent hot water from being pumped through the circulation line when it is not used. In order to prevent the circulating pump from being switched on again after a brief pause, the re-start is avoided by the adjustable waiting time.

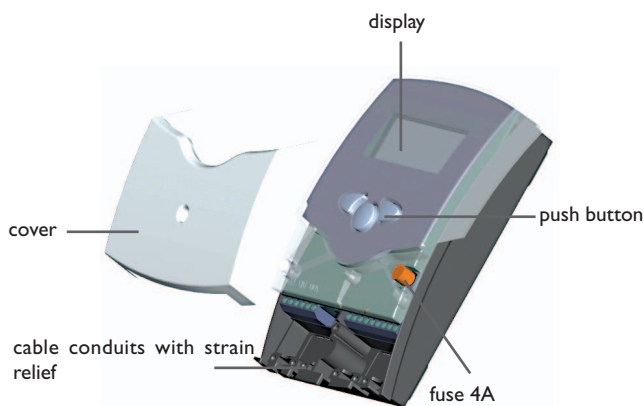
In the case that the tap has not been opened for 12 hours (e.g. when the user is on holiday), the pump will be put into operation for the adjusted runtime R_c . This will protect the store against Legionella that can easily appear when the water is not flowing (Legionella protection). The time value is preadjusted to 12 h.

Note:

In order to prevent water from being mixed with water from the circulation line, a circulating pump with a non-return valve should be used.

2. Installation

2.1 Mounting



WARNING!

Electric shock!

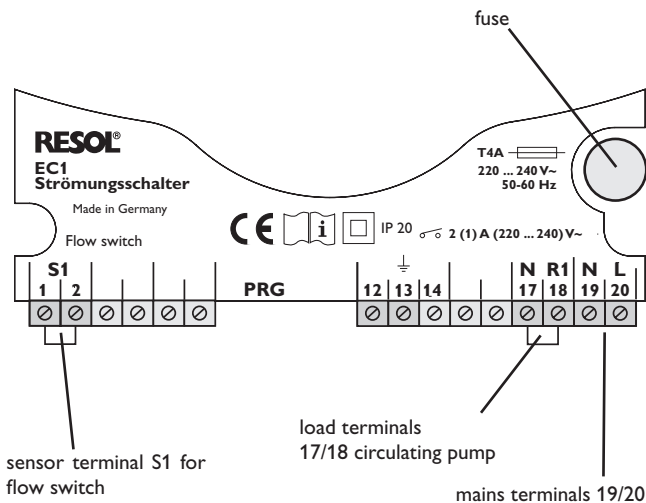
Opening the housing will expose live parts!

Switch off power supply and disconnect the device from power supply before opening the housing!

The controller must additionally be supplied from a doublepole switch with contact gap of at least 3 mm [0.12"]. Route sensor cables and power supply cables separately.

1. Unscrew the cross-head screw from the cover and remove it along with the cover from the housing
2. Mark the upper fastening point on the wall and drill
3. Fasten the enclosed wall plug and screw leaving the head protruding
4. Hang the housing from the upper fastening point and mark the lower fastening point through the hole in the terminal box (centers 130 mm [5.1"])
5. Drill and insert the lower wall plug
6. Fasten the housing to the wall with lower fastening screw and tighten
7. Complete electrical connections in accordance with terminal allocations, see chap. „2.2 Electrical connection“
8. Place the cover back onto the housing
9. Fasten the cover by means of the cross-head screw

2.2 Electrical connection



Connecting the device to the mains supply must always be the last step of the installation!

The power supply to the controller must be carried out via an external power switch (last step!). The supply voltage must be 100 ... 240 V~ (50 ... 60 Hz). Flexible cables must be attached to the housing with the enclosed strain relief and the corresponding screws.

The controller is equipped with one standard relay, to which loads such as pumps, valves etc. can be connected:

- 18 = conductor R1
- 17 = neutral conductor N
- 13 = ground conductor \perp

The flow switch (S1) is to be connected to the following terminals with either polarity:

- 1 / 2 = flow switch

The mains supply is to be carried out at the terminals:

- 19 = neutral conductor N
- 20 = conductor L
- 12 = ground conductor \perp

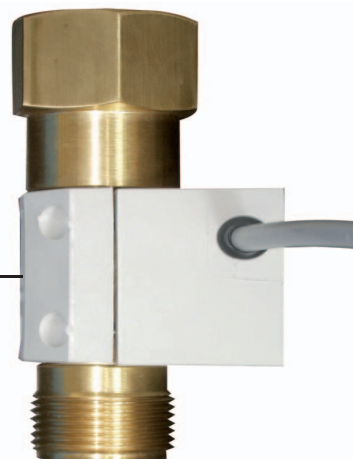
3. Flow switch

The flow switch detects water flow in your pipe system and indicates if water is being drawn-off. Along with other variables, the controller analyses these data and controls the circulating pump. As the flow switch detects water movement in one direction only, please pay attention to the correct flow direction when mounting the device. In order to prevent the flow switch from calcifying early, we recommend using it in the cold water area/store inlet. The two-wire cable of the flow switch can be extended to 100m without any problem. When using long cables or cable conduits, please use shielded or twisted lines.

Flow control switch with pipe section

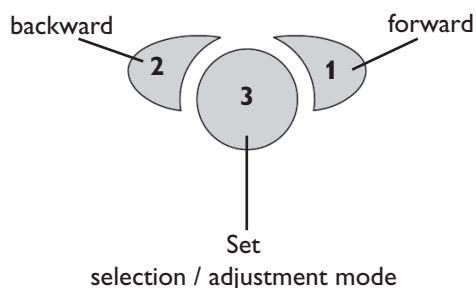
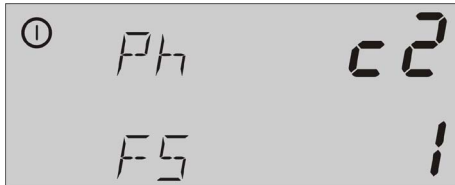
- pipe section: brass
- housing: plastic
- vertical installation (max. $\pm 15^\circ$)
- 22 mm fitting, flat sealing
- 3/4" connection
- reed contact, max. 300 V DC / 1 A

Note
The flow switch will only work in the correct, vertical position.
Install the flow switch in a vertical position! Mind the flow direction!



4. Operation and function

4.1 Push buttons



The controller is operated via three push buttons below the display. Button 1 is used for scrolling forward through the indication menu or to increase the adjustment values. Button 2 is used for scrolling backward and reducing values. Button 3 is used for selecting channels and confirming adjustments.

The adjustment channels appear below the display channels. Scroll through the display channels by pressing buttons 1 and 2. Scroll down in the display menu and press button 1 for approx. two seconds after you have reached the display item tc. When an adjustment value is shown on the display, "SEt" is indicated in the screen. Press button 3 in order to access the adjustment mode. "SEt" starts flashing. Adjust the value using buttons 1 and 2. Briefly press button 3, "SEt" permanently appears, the adjusted value will be saved.

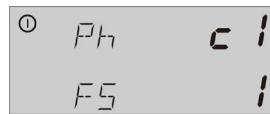
- **Select a channel by buttons 1 and 2**
- **Briefly press button 3 so that "SEt" flashes**
- **Adjust the value by buttons 1 and 2**
- **Briefly press button 3 so that "SEt" permanently appears, the adjusted value is now saved**

4.2 Controller parameter and indication channels

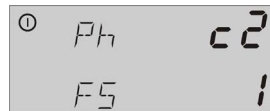
- **Ph = Phase**
Phase 1: The contactor has been switched on, the circulating pump is put into operation for the runtime **Rc** (Runtime of circulation).
Phase 2: Water has been tapped over a longer period, the circulating pump switches off after the runtime **Rc** is over.
- **FS = Flow Switch**
Flow switch
0 = open contact, no water flow
1 = closed contact, water flow
- **tc = control time of circulation**
Check channel for Rc and Wc
- **Rc = Runtime of circulation**
Runtime of the circulation
- **Wc = Waiting time for (next) circulation**
Waiting time
- **Dc = Delay circulation**
Switch-on delay for the circulating pump
- **MM = Mode Manual**
Manual mode
0 = manually off
1 = manually on
2 = automatic operation
- **Pg = Programme**
Programme
- **VN = Version Number**
Version number

4.3 Phase (Ph)

Phase **c1**: The flow switch has been closed and the controller puts the circulating pump into operation if for the runtime Rc.



Phase **c2**: After the runtime Rc is over, the pump is switched off at least for the duration of the waiting time Wc.



Ph shows the current phase or the state of the controller. The flow switch is closed during draw off, the controller is in phase c1 and puts the circulating pump into operation. After the runtime Rc has ended, the controller switches the pump off again and is in phase c2.

The controller stops for the adjusted runtime Wc before the pump can be put into operation again. This way, unnecessary pump operation and water circulation can be avoided.

If water is being drawn off again within the time interval Wc, the counter will be switched off for the duration of the draw off for the waiting time and will be put into operation again. This way, the whole time interval between the first and the second pumping process, during which there is no water flow, equals the adjusted time interval Wc.

4.4 Runtime / Disinfection (Rc)

Rc: Circulation runtime
(Runtime of circulation)
Factory setting: 2 Min
Indication in minutes
Adjustment range: 0:01 ... 0:10



The runtime Rc indicates the time (hh:mm) in which the pump is put into operation by the controller during draw off. The runtime Rc is simultaneously used for the disinfection function. This function puts the pump into operation automatically for the runtime, if no water has been drawn off within 12 hours.

4.5 Waiting time (Wc)

Wc:
Waiting time for next circulation
Factory setting: 10 Min
Indication in minutes
Adjustment range: 0:00 ... 0:20
If Wc is set to 0:00, the pump will be operating as long as the flow switch is closed.



Wc stands for the waiting time (hh:mm) during which the controller puts the circulating pump into operation after the runtime Rc is over. If water is being drawn off during the waiting time, the time counter is switched off and will be switched on again afterwards. This will avoid unnecessary pumping of hot water through the pipe system.

4.6 Switch-on delay (Dc)

Dc: Delay
Factory setting: 0 s
Adjustment range: 0 ... 2 s



The switch-on delay is the time during which the flow switch FS08 must be closed in order to detect water flow. This will prevent the circulating pump from being switched by water hammer in the pipes.

4.7 Manual / Automatic mode (MM)

MM : Manual mode
(ManualMode)
Factory setting : 2



- MM Pump
- 0 off
- 1 on
- 2 auto



By means of the adjustment value MM3, different operation modes for the controller can be selected: Manually on, manually off and automatic.

4.8 Check value flow switch (FS)

FS: Status of the flow switch
(FlowSwitch)

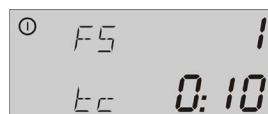
0 = no draw-off
1 = draw-off



The FS value indicates water flow in the circulation system. During draw-off FS = 1 is displayed, if no water is being drawn off, the controller displays FS = 0.

4.9 Counter of the current time frame (tc)

tc: Check time for Rc or Wc
(control time of circulation)



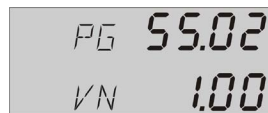
The output value tc is a time counter that counts up from $t=0$ to the value of Rc or Wc depending on the current phase.

During phase c1, the value tc indicates the counter from 0 to Rc, in phase c2, the counter from 0 to Wc.

4.10 Programme and Version (PG and VN)

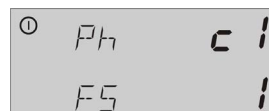
PG: Programme
(ProGramme)

VN: Version number
(VersionNumber)



PG specifies the current hardware programme number and VN the current software version.

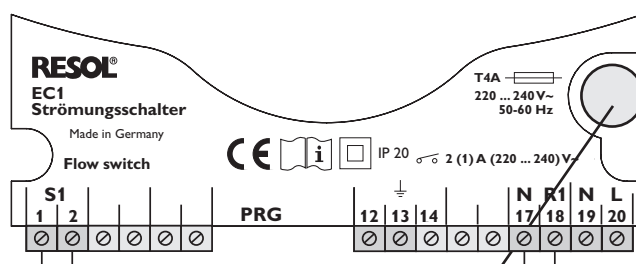
5. Commissioning



Establish the power supply. During a short initialisation phase, the operating control lamp flashes red and green. After initialisation, the controller is in the automatic mode with typical settings. Now the controller is ready for operation with typical settings to suit that system and normally the factory settings will give close to optimum operation.

Control parameters can be individually adjusted in the adjustment channels (see 4.2), if necessary.

6. Troubleshooting



If the EC1 controller does not work correctly, please check the following items:

Power supply

If the operating control lamp is off, please check the powersupply of the controller.

Fuse

The controller is protected with 1 can fuse. T4 A. This fuse can be replaced when the cover is removed (spare fuse is enclosed in the accessory bag).

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Notes

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