District Heating Controller

for 1 heating circuit and d.h.w. heating

RVD120
RVD140

Multifunctional heating controller for use in district heating substations and district heating plants with Modbus communication. Suited for one heating circuit with d.h.w. heating in instantaneous systems or with storage tank. Eight programmed plant types. Operating voltage AC 230 V.

Use

- **Plant:**
  Heat exchanger in the district heating substation

- **Buildings:**
  Residential and non-residential buildings with own district heating connection and d.h.w. heating

- **Types of space heating systems:**
  All common heating systems, such as radiator, convector, underfloor and ceiling heating systems, or radiating panels

- **Types of d.h.w. heating systems:**
  - D.h.w. storage tanks or instantaneous systems
  - Common or separate heat exchangers for heating circuit and d.h.w. heating
  - D.h.w. heating with electric immersion heater and solar collector
Functions

**Heating circuit control**
- Weather-compensated flow temperature control, mixing valve with 3-position actuator
- Weather-compensated flow temperature control with room temperature influence, mixing valve with 3-position actuator
- Room temperature-compensated flow temperature control, mixing valve with 3-position actuator
- Demand-dependent control of the common flow

**D.h.w. heating**
- D.h.w. heating via heat exchangers in storage tanks
- Instantaneous d.h.w. heating via heat exchanger with or without mixing valve in the secondary circuit
- D.h.w. heating with electric immersion heater and solar collector

**Additional functions**
- Quick setback
- Automatic heating limit (ECO function)
- Frost protection (for the building, plant, and d.h.w.)
- Annual clock for annual holidays, with automatic summer-/wintertime changeover
- Independent time switch programs for room heating and d.h.w.
- Pump kick
- Idle heat function in the case of instantaneous d.h.w. heating via the parallel heat exchanger
- Flow switch with adjustable load limit, protection against tampering and adaptation to the seasons
- Maximum limitation of return temperature differential (DRT-limitation)
- Relay and sensor tests
- Remote operation via room unit
- Refill function
- Communication via Modbus

**Type summary**

<table>
<thead>
<tr>
<th>Description</th>
<th>Documentation in languages</th>
<th>Key feature</th>
<th>Product no.</th>
<th>Order number</th>
</tr>
</thead>
<tbody>
<tr>
<td>District heating and d.h.w. controller</td>
<td>German, French, English, Italian, Danish, Finnish, Swedish, Polish, Czech, Greek, Russian, Bulgarian, Romanian</td>
<td>Supports plant types no. 1…3</td>
<td>RVD120-A</td>
<td>S55370-C109</td>
</tr>
<tr>
<td>District heating and d.h.w. controller</td>
<td>German, French, English, Italian, Danish, Finnish, Swedish, Polish, Czech, Greek, Russian, Bulgarian, Romanian</td>
<td>Supports plant types no. 1…8</td>
<td>RVD140-A</td>
<td>S55370-C113</td>
</tr>
</tbody>
</table>

**Ordering**

Sensors, room unit, actuators and valves must be ordered as separate items.
Product documentation

<table>
<thead>
<tr>
<th>Type of documentation</th>
<th>Classification number</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Documentation</td>
<td>P2510</td>
<td>–</td>
</tr>
<tr>
<td>Operating instructions (languages: de, en, fr, it, da, fi, sv)</td>
<td>B2510</td>
<td>74 319 0683 0</td>
</tr>
<tr>
<td>Operating instructions (languages: pl, cs, el, ru, bu, ro)</td>
<td>B2510</td>
<td>74 319 0684 0</td>
</tr>
<tr>
<td>Installation instructions (languages: de, en, fr, it, da, fi, sv)</td>
<td>G2510</td>
<td>74 319 0681 0</td>
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<tr>
<td>Installation instructions (languages: pl, cs, el, ru, bu, ro)</td>
<td>G2510</td>
<td>74 319 0682 0</td>
</tr>
<tr>
<td>CE Declaration of Conformity</td>
<td>T2510</td>
<td>–</td>
</tr>
<tr>
<td>Environmental Declaration</td>
<td>E2510</td>
<td>–</td>
</tr>
</tbody>
</table>

Equipment combinations

Suitable sensors and room units
- Flow, return and d.h.w. temperature: All sensors with sensing element LG-Ni 1000, for example:
  - Strap-on sensor QAD22
  - Immersion sensor QAE212... and QAP21.3
  - Collector sensor (solar) QAP21.2
- Room temperature:
  - Room unit QAA50.110/101 and QAW70
- Outdoor temperature:
  - Outside sensor QAC22 (LG-Ni 1000 sensing element)
  - Outside sensor QAC32 (NTC measuring element)
- Pressure: sensor with output signal DC 0...10 V:
  - Pressure sensor QBE2002...

Suitable actuators
All electromotoric and electrohydraulic actuators for 3-position control and with an operating voltage AC 24...230 V made by Siemens can be used.

Communication
Plants can be remotely monitored, read and operated via Modbus RTU. An appropriate master is required as communications partner. The controllers communicate as slaves via Modbus RTU.
The Basic Documentation P2510 includes a table with all Modbus data points.

Technical design

Functioning
- Controller RVD120 has 3 plant types preprogrammed
- Controller RVD140 has 8 plant types preprogrammed

When commissioning the system, the respective plant type must be selected. The required functions, settings and displays will then be automatically assigned. The parameters not required for the plant in question will not be shown.

Optional functions must be configured as such.

Plant types

![Plant type no. 1 – RVD120 and RVD140](image)

Heating circuit control without d.h.w. heating
RVD140: Refill function optional
Plant type no. 2 – RVD120 and RVD140
Heating circuit control with d.h.w. heating (storage tank).
RVD140: Circulating pump, refill function, electric immersion heater and solar d.h.w. heating pump optional

Plant type no. 3 – RVD120 and RVD140
Heating circuit control with d.h.w. heating (storage tank).
RVD140: Circulating pump, refill function, electric immersion heater and solar d.h.w. heating optional

Plant type no. 4 – only RVD140
Separate heat exchangers for heating circuit and d.h.w. heating (instantaneous system).
Sensor B71:
• as a d.h.w. sensor, or
• for DRT function
Circulating pump, flow switch and refill function optional.
Selectable idle heat function.

Plant type no. 5 – only RVD140
Separate heat exchangers for heating circuit and d.h.w. heating, 2-stage d.h.w. control: 1st stage in the primary return, 2nd stage with mixing valve in the secondary flow.
Flow switch, refill function and externally controlled circulating pump optional.
Selectable idle heat function.

Plant type no. 6 – only RVD140
Separate heat exchangers for heating circuit and d.h.w. heating. Instantaneous storage tank connected to separate heat exchanger, d.h.w. charging with charging pump.
Sensor B71:
• as a d.h.w. sensor, or
• for DRT function
Circulating pump, refill function, electric immersion heater and solar d.h.w. heating optional.

Plant type no. 7 – only RVD140
Two heat exchangers connected in series for heating circuit and d.h.w. heating. Instantaneous storage tank connected to the second heat exchanger, with mixing valve control for d.h.w.
Sensor B71:
• as a d.h.w. sensor, or
• for DRT function
Refill function, electric immersion heater, solar d.h.w. heating and externally controlled circulating pump optional.
Plant type no. 8 – only RVD140

Heating circuit control

Operating modes

- **Auto**
  Automatic heating according to the time switch program, automatic ECO function and room unit active

- **Continuous operation**
  Heating with no time switch program, setpoint adjustment with the setting knob

- **Protection**
  Heating off, frost protection ensured

- **Automatic d.h.w. heating**

- **Manual operation**
  No control, circulating pumps in service

Frost protection is ensured in all operating modes.

 Acquisition of measured values

- Flow sensor: LG-Ni 1000
- Outside sensor: LG-Ni 1000 or NTC 575
- Pressure sensor: DC 0…10 V
- Primary return sensor: LG-Ni 1000
- Room temperature: With PPS-room unit or PPS-room sensor

If different types of sensors are used, the controller automatically identifies the type of sensor connected.

 Compensating variables

With weather-compensated control systems, the composite outside temperature is used as the compensating variable. It is generated from the actual and the attenuated outside temperature (calculated by the controller). Consideration is given to the type of building construction (adjustable for light and heavy buildings).

 Setpoints

The following setpoints can be adjusted:

- Nominal room temperature
- Reduced room temperature
- Room temperature for frost protection
• Weather-compensated control:
The flow temperature setpoint is controlled in function of the prevailing outside temperature via the heating curve
• Weather-compensated control with room temperature influence:
The flow temperature setpoint is controlled in function of the prevailing outside temperature and, in addition, in function of the deviation of the actual room temperature from the setpoint
• Room temperature-compensated control:
The setpoint is controlled in function of the deviation of the actual room temperature from the setpoint

**Control**
The controlled variable is always the secondary flow temperature. In all types of plant, it is controlled through a two-port valve in the primary return depending on the plant's total demand for heat (space heating plus – if present – d.h.w. heating).

**Maximum limitation of return temperature**
The valve in the primary circuit starts traveling towards the closed position when the limit value is exceeded. The characteristic is constant-shifting depending on the outside temperature.

**Quick setback**
When changing from the normal temperature to a lower temperature level ( or ), the heating will be shut down.
- If there is a room sensor present, it will be switched on again when the setpoint of the lower temperature level is reached
- If there is no room sensor present, quick setback is active during a defined period of time, which depends on the type of building construction and an adjustable gain factor. The function can be deactivated, if required

**Automatic ECO function**
With the automatic ECO function, the heating is controlled depending on demand. The heating will be shut down if permitted by the outside temperature. Consideration is given to the actual, the attenuated and the composite outside temperature, as well as to an adjustable heating limit.
The ECO function requires the use of an outside sensor. It can be deactivated, if desired.

**Maximum and minimum limitation of flow temperature**
Both limitations are accomplished via the heating curve. When the limit value is reached, the heating curve assumes a constant value. Any active limitation is shown on the display.
Both limitations can be deactivated.

**DRT function**
The differential between the primary and the secondary return temperature is limited to a maximum value.

**Time switch programs**
To provide automatic operation of the heating system, the controller RVD120/140 features a weekly program with 3 heating periods that can be adjusted on a daily basis. Another weekly program is available for the release of d.h.w. charging.

**Pump kick**
The pump kick is adjustable for the heating circuit pump, the d.h.w. charging pump, the collector pump and the circulating pump. The pump kick is made once per week and lasts 30 seconds.
The function can be deactivated, if required.
Relay and sensor tests
To facilitate commissioning and fault tracing, both relay and sensor tests can be made:
- Relay test: each of the relays can be manually energized
- Sensor test: all sensor values can be interrogated

Pulse lock with actuators
The total duration of the closing pulses delivered to an actuator is limited to five times the actuator’s running time, in order to extend the life of the relay contacts.

Raising the reduced room temperature
The setpoint of the reduced room temperature can be raised as the outside temperature falls. The increase (effect) is adjustable.
This function can be deactivated, if required.

Frost protection for the building
Frost protection for the building ensures an adjustable minimum room temperature.
This function cannot be deactivated.

Frost protection for the plant
Frost protection for the plant protects the heating plant against freeze-ups through activation of the heating circuit pump. This function can be provided with or without an outside sensor:
- With outside sensor:
  Outside temperature ≤ 1.5 °C: the heating circuit pump runs for 10 minutes at 6-hour intervals
  Outside temperature ≤ –5 °C: the heating circuit pump runs continuously
- Without outside sensor:
  Flow temperature ≤ 10 °C: the heating circuit pump runs for 10 minutes at 6-hour intervals
  Flow temperature ≤ 5 °C: the heating circuit pump runs continuously
This function can be deactivated, if required.

Refill function
The controller RVD140 supports the refill function to maintain the secondary side plant pressure.
If it drops below a minimum value, water – from the primary side or from a separate tank – is refilled in the secondary plant circuit to increase the pressure.
D.h.w. heating

In addition to heating circuit control, the RVD120/140 provide control of d.h.w. heating in the following types of plant and d.h.w. systems:

<table>
<thead>
<tr>
<th>Plant type no.</th>
<th>RVD120</th>
<th>RVD140</th>
<th>D.h.w. system</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>●</td>
<td>●</td>
<td>–</td>
</tr>
<tr>
<td>2</td>
<td>●</td>
<td>●</td>
<td>Storage tank connected to common heat exchanger</td>
</tr>
<tr>
<td>3</td>
<td>●</td>
<td>●</td>
<td>Storage tank connected to common heat exchanger</td>
</tr>
<tr>
<td>4</td>
<td>●</td>
<td>●</td>
<td>Instantaneous system connected to a parallel heat exchanger</td>
</tr>
<tr>
<td>5</td>
<td>●</td>
<td>●</td>
<td>Instantaneous system connected to a parallel heat exchanger</td>
</tr>
<tr>
<td>6</td>
<td>●</td>
<td>●</td>
<td>Instantaneous storage tank connected to a parallel heat exchanger</td>
</tr>
<tr>
<td>7</td>
<td>●</td>
<td>●</td>
<td>Instantaneous storage tank connected to common heat exchanger</td>
</tr>
<tr>
<td>8</td>
<td>●</td>
<td>●</td>
<td>Storage tank connected to common heat exchanger</td>
</tr>
</tbody>
</table>

Acquisition of measured values

The acquisition of the d.h.w. temperature is provided with sensors LG-Ni 1000 connected to terminals B3, B32 and B71.

D.h.w. functions with all types of plant

- Settings: Normal setpoint and reduced setpoint, maximum setpoint, setpoint boost and switching differential
- Frost protection for d.h.w.: a minimum temperature of 5 °C is always maintained
- D.h.w. OFF: d.h.w. heating can be manually switched off
- Maximum limitation of the primary return temperature: adjustable is a limit value independent of heating circuit control

Plant type-specific d.h.w. functions

- Release:
  With plant types no. 2...8, release of d.h.w. heating can be selected:
  - According to own d.h.w. time switch program
  - During the controller's heating periods, with or without forward shift of the first daily release
  - Always (24 hours per day)
- Priority: the behavior of the heating circuit during d.h.w. charging can be selected:
  - Absolute: heating circuit pump deactivated (plant type no. 8: mixing valve fully closed, heating circuit pump remains activated)
  - Shifting: heating circuit pump remains activated as long as there is sufficient heating energy available (plant type no. 8: mixing valve throttled). The d.h.w. setpoint or maximum setpoint is maintained
  - Parallel: no priority; heating circuit remains ON. The d.h.w. setpoint or maximum setpoint is maintained
- Idle heat function: in instantaneous systems, the heat exchanger's primary side is periodically heated up
- Flow switch: to improve the heat exchanger's control performance, with adjustable load limit, adapts to the seasons, tamperproof (prevents the control system from responding too frequently).
- Forced charging: d.h.w. charging takes place every day on the first release (or at midnight with the 24-hour program). It also takes place if the actual value lies within the switching differential
- Manual charging:
  - Independent of the time switch program and temperature conditions
  - During protection mode
- D.h.w. heating with electric immersion heater or solar collector:
  In plant types with d.h.w. storage tank, one of the two multifunctional relays of the RVD140 can be parameterized for d.h.w. heating using an immersion heater or a solar collector
Extra functions
Remote operation via room units
• Room unit QAW50: changeover of operating mode, room temperature setpoint adjustments and room temperature readjustments
• Room unit QAW70: overriding the setpoints and the heating program, entry of holiday periods

Parameter reset
All settings made can be reset to the factory settings.

Manual operation
In manual operation, the heating can be controlled manually. In that case, d.h.w. heating will be shut down and the relays switched as follows:
• Actuator of primary return valve: no power supply, but can be manually controlled from the controller
• Other actuators: fully closed, no power supply
• Heating circuit pump: activated
• D.h.w. charging pump, collector pump and circulating pump: activated
• Electric immersion heater: released

Mechanical design
Controller
The RVD120/140 is comprised of controller insert and base. The controller insert accommodates the electronics, the power section, the output relays and — on the front of the unit — the LCD featuring background lighting and all operating elements.
Two screws are used to secure the controller insert to the base, which carries the connection terminals.
The RVD120 contains four relays, the RVD140 nine.
The controller can be mounted in three different ways:
• Wall mounting (on a wall, in a control panel, etc.)
• Top hat rail mounting
• Flush panel mounting (compact station, control panel front, etc.)

Display and operating elements

Front view of RVD140
1 Operating mode buttons
2 Display (LCD)
3 Buttons for selecting operating lines
4 Button for manual operation ON / OFF
5 Button for d.h.w. heating ON / OFF
6 Buttons for making readjustments of values
7 Setting knob for nominal room temperature setpoint

Front view of RVD120

Operation
Analog operating elements
• Buttons for selecting the required operating mode and for d.h.w. ON / OFF
• Setting knob for the room temperature setpoint in continuous operation
• Button for manual operation
The entry or readjustment of all the other setting parameters, activation of optional functions, and reading of actual values and statuses is made using the operating line principle. An operating line with an associated number is assigned to each parameter, each actual value and each function that can be selected. One pair of buttons is used to select an operating line and one pair to readjust the display.
These buttons are located behind a hinged cover. The operating instructions are inserted at the rear of the cover.
Notes

Engineering
- The wires of the measuring circuits carry extra low voltage
- The wires to the actuator and the pumps carry AC 24…230 V
- The local regulations for electrical installations must be complied with
- Sensor cables may not be run parallel to mains carrying cables for loads such as actuators and pumps (safety class II to EN 60730)
- In control systems using a room sensor, the reference room may not be equipped with thermostatic radiator valves. Manual valves must be locked in their fully open position
- Local regulations as well as requirements of the district heat supplier when using the refill function must be complied with

Mounting
- Suitable mounting locations are compact stations, control panels, control desks or the heating room. Not permitted are wet or damp locations
- Mounting methods: wall, top hat rail or panel cutout
- Cable tension relief must be ensured
- Cable glands made of plastic must be used
- All terminals for extra low voltage (sensors and room unit bus) are located in the upper section of the terminal compartment, those for mains voltage (actuators and pumps) in the lower section

Commissioning
- The plant type must be selected
- The settings of the district heating parameters can be locked
- The controller is supplied complete with mounting and commissioning instructions

Disposal
The device is considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage.
- Dispose of the devices through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Warranty
When using the RVD120/140 together with third-party devices not specifically mentioned, correct functioning must be ensured by the user. In that case, Siemens will assume no responsibility for service and warranty.
### Technical data

<table>
<thead>
<tr>
<th>Power supply</th>
<th>Operating voltage</th>
<th>AC 230 V (+10 / −15 %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>50 Hz</td>
<td></td>
</tr>
<tr>
<td>Power consumption (no external load)</td>
<td>RVD120: max. 5.5 VA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RVD140: max. 6.5 VA</td>
<td></td>
</tr>
<tr>
<td>External supply line protection</td>
<td>Slow-blow fuse max. 10 A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>or</td>
<td>Circuit breaker max. 13 A</td>
</tr>
<tr>
<td></td>
<td>Characteristic B, C, D according to EN 60898</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Inputs</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor inputs (B…)</td>
<td>Sensing elements</td>
<td>refer to sections &quot;Acquisition of measured values&quot;</td>
</tr>
<tr>
<td>Digital input (H5)</td>
<td>Voltage with contact open</td>
<td>DC 12 V</td>
</tr>
<tr>
<td></td>
<td>Current with contact closed</td>
<td>DC 3 mA</td>
</tr>
<tr>
<td></td>
<td>Contact resistance</td>
<td>R ≤ 80 Ω</td>
</tr>
<tr>
<td>Analog inputs (U…)</td>
<td>Operating range</td>
<td>DC 0…10 V</td>
</tr>
<tr>
<td></td>
<td>Input resistance</td>
<td>R &gt; 100 kΩ</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Relay outputs</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated switching voltage</td>
<td>AC 24…230 V</td>
<td></td>
</tr>
<tr>
<td>Rated current Y1, Y2, Q1, K6, K7</td>
<td>AC 0.02…1(1) A</td>
<td></td>
</tr>
<tr>
<td>Rated current Y5, Y6, Q3/Y7, Q7/Y8</td>
<td>AC 0.02…2(2) A</td>
<td></td>
</tr>
<tr>
<td>Switch-on current</td>
<td>max. 10 A max. 1 s</td>
<td></td>
</tr>
<tr>
<td>Max. rating as mixing valve relay</td>
<td>15 VA</td>
<td></td>
</tr>
<tr>
<td>External supply line protection</td>
<td>See section power supply</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Interfaces</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Modbus RTU</td>
<td>Basic system</td>
<td>RS485 (EIA-485). For details, refer to the modbus specification</td>
</tr>
<tr>
<td></td>
<td>Connection</td>
<td>2-wire, twisted pairs, shielded</td>
</tr>
<tr>
<td></td>
<td>Bus terminator (not included in delivery)</td>
<td>terminating resistor 150 Ω (0.5 W) for the first and last device on the bus</td>
</tr>
<tr>
<td>PPS</td>
<td>Connection</td>
<td>2-wire, interchangeable</td>
</tr>
<tr>
<td></td>
<td>(room unit or room sensor)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Permissible cable lengths</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>For all sensors</td>
<td>Copper cable, 0.6 mm dia.</td>
<td>20 m</td>
</tr>
<tr>
<td></td>
<td>Copper cable, 1.0 mm²</td>
<td>80 m</td>
</tr>
<tr>
<td></td>
<td>Copper cable, 1.5 mm²</td>
<td>120 m</td>
</tr>
<tr>
<td>For the room units (PPS)</td>
<td>Copper cable, 0.25 mm²</td>
<td>25 m</td>
</tr>
<tr>
<td></td>
<td>Copper cable, from 0.5 mm²</td>
<td>50 m</td>
</tr>
<tr>
<td>For the data bus (Modbus)</td>
<td>Copper cable, from 0.25 mm²</td>
<td>1000 m</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Connection terminals</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Screw terminals</td>
<td>for wire section up to 2.5 mm²</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Backup</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Backup of controller clock</td>
<td>12 h</td>
<td></td>
</tr>
</tbody>
</table>

Siemens
District heating controller RVD120, RVD140
Building Technologies
CE1N2510en
2018-04-16
Standards, directives and approvals

<table>
<thead>
<tr>
<th>Product standard</th>
<th>EN 60730-1</th>
<th>Automatic electrical controls for household and similar use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electromagnetic compatibility</td>
<td>(Applications)</td>
<td>For use in residential, commerce, light-industrial and industrial environments</td>
</tr>
<tr>
<td>EU conformity (CE)</td>
<td>CE1T2510xx *)</td>
<td></td>
</tr>
<tr>
<td>RCM-conformity (EMC)</td>
<td>CE1T2513en_C1 *)</td>
<td></td>
</tr>
<tr>
<td>EAC conformity</td>
<td>Eurasia conformity</td>
<td></td>
</tr>
</tbody>
</table>

Environmental compatibility

Product environmental declaration (contains data on RoHS compliance, materials composition, packaging, environmental benefit, disposal) CE1E2510 *)

Eco design and labeling directives

<table>
<thead>
<tr>
<th>Application with one room temperature sensor and one outdoor temperature sensor and modulating control</th>
<th>Class</th>
<th>Efficiency gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>VI</td>
<td>4.0%</td>
<td></td>
</tr>
</tbody>
</table>

*) The documents can be downloaded from http://siemens.com/bt/download.

Classifications to EN 60730

| Software class | A |
| Mode of operation | type 1B (automatic controls) |

Safety data

| Safety class | II to EN 60730 (when correctly installed) |
| Degree of protection | IP 40 to EN 60529 (when correctly installed) |
| Degree of contamination | 2 to EN 60730 |

Dimensions

refer to “Dimensions”

Weight

| Unit (net) | RVD120: 0.74 kg |
| RVD140: 0.84 kg |

Colors

| Controller insert | light grey RAL 7035 |
| Terminal base | pigeon blue RAL 5014 |

Environmental conditions

<table>
<thead>
<tr>
<th>Operation EN 60721-3-3</th>
<th>Transport EN 60721-3-2</th>
<th>Storage EN 60721-3-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climatic conditions</td>
<td>class 3K5</td>
<td>class 2K3</td>
</tr>
<tr>
<td>Temperature</td>
<td>0…+50 °C</td>
<td>-25…+70 °C</td>
</tr>
<tr>
<td>Humidity</td>
<td>&lt;95 % r.F. (non-condensing)</td>
<td>&lt;95 % r.F.</td>
</tr>
<tr>
<td>Mechanical conditions</td>
<td>class 3M2</td>
<td>class 2M2</td>
</tr>
<tr>
<td>Use above sea level</td>
<td>max. 3000 m above sea level</td>
<td></td>
</tr>
</tbody>
</table>
Connection diagrams

Low voltage side

**RVD120**

![Diagram of RVD120](image)

**RVD140**

![Diagram of RVD140](image)

* Terminating resistor 150 Ω (0.5 W) for the first and last device on the bus.

See Modbus specification for details

Mains voltage side

**RVD120**

*(Plant types no. 1, 2, 3)*

1 actuator and 2 pumps or
1 actuator, 1 pump and
1 changeover valve

**RVD140**

*(Plant type no. 5)*

3 actuators and 1 pump

**RVD140**

*(Plant types no. 1, 2, 3, 4, 6, 7, 8)*

2 actuators and 3 pumps or
2 actuators, 2 pumps and
1 changeover valve

- **A6**: Room unit / sensor
- **B1**: Flow sensor
- **B3**: D.h.w. sensor / storage tank sensor 1
- **B32**: Storage tank sensor 2
- **B6**: Collector sensor
- **B7**: Primary return sensor
- **B71**: Universal sensor
- **B9**: Outside sensor
- **H5**: Flow switch
- **K6 and K7**: Multifunctional outputs for refill
- **M1**: Heating circuit pump
- **M3**: D.h.w. charging pump
- **M7**: Circulating pump
- **N1**: Modbus RTU
- **N2**: Data bus
- **N3**: Controller RVD120
- **N4**: Controller RVD140
- **U1**: Secondary pressure sensor
- **U2**: Primary pressure sensor
- **Y1**: Actuator of two-port valve in the primary return
- **Y5**: Actuator of two-port valve / mixing valve
- **Y7**: Actuator of changeover valve / mixing valve

Siemens District heating controller RVD120, RVD140

Building Technologies

CE1N2510en

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