SIEMENS

Energy Manager / Heating Controller

RVP540 RVP550

The RVP540 and RVP550 energy managers / controllers are designed for the coordinated control of heat generating equipment:

- **2 or 3 heat sources such as:**
  Solar collectors, wood-fired boilers, heat pumps, oil- or gas-fired boilers (the RVP540 can control a max. of 2, the RVP550 a max. of 3 heat sources)
- **Buffer and / or d.h.w. storage tanks, or combi storage tanks**
- **Pump or mixing heating circuit**
- **Integrated communication**
- **More than 500 basic plant diagrams integrated, offering more than 2,500 plant combinations**
- **Configuration tool, permitting straightforward plant selection**
- **Operating voltage AC 230 V, CE conformity**

Use

- Types of houses and buildings:
  - Single-family houses
  - Multifamily houses
  - Large housing estates with central heat generation
  - Energy centers
  - Commercial and industrial buildings
  - Buildings in which alternative energy sources are used

- Types of plant:
  - Solar collectors
  - Wood-fired boilers
  - Heat pumps
  - Oil / gas burners (single-stage, 2-stage or modulating)
  - Wall-hung gas boilers
  - D.h.w. heating
  - Basic and complex buffer storage tanks
  - Mixing or pump heating circuits

Functions

Heat generation
- Mono- or multivalent (RVP550)
- With oil- or gas-fired boilers
- With wood-fired boilers
- With heat pump
- With solar collectors
- Management of buffer, d.h.w. and combi storage tanks
- Heat generation controlled either directly by the RVP5xx or by an additional controller of the SIGMAGYR™ range (e.g. RVL471, RVL472, or Boiler Management Unit BMU)
- Temperature setpoint of the heat source depending on the demand signal delivered by the heating circuits connected to the system
- Temperature setpoint of the heat source depending on the temperature requisition (DC 0…10 V, input H1, for controller outside the system)
- Heat generation lock or minimum temperature requisition with remote switch (via contact H1)
- Overload detection (shifting priority)
- "Green" operation (energy delivered exclusively by wood-fired boiler or solar panel)
- Manual operation
- Chimney sweep function
- Automatic operation

Heating circuit
- Weather-compensated heating circuit control with or without room influence
- Adjustable maximum limitation of the temperature requisitions delivered to the heat generating equipment
- Quick setback and boost heating
- Automatic 24-hour heating limit
- Automatic summer / winter changeover
- The building's thermal dynamics are taken into consideration
- Automatic adaption of heating curve to the building and to the demand for heat (provided a room unit is connected)
- Floor curing function
- Optimum start / stop control

Protection for the plant
- Protective boiler startup (acting on the consumers)
- Minimum limitation of the boiler return temperature (acting on the mixing valve, by-pass pump and / or the consumers)
- Boiler overtemperature protection (pump overrun)
- Adjustable minimum and maximum limitation of the boiler temperature
- Cycling protection for heat generation
- Frost protection for the building and the plant
- Frost protection for the boiler and the d.h.w. storage tank connected directly to the controller
- Periodic pump kick
- Overtemperature protection for the pump heating circuit
- Overtemperature protection for the storage tank and the solar panel circuit

Operation
- Room temperature adjustment with the setting knob

- Automatic button for economical automatic operation throughout the year
- Operating mode buttons
- Button for "green" operation
- Info button for additional information about the plant
- D.h.w. button
- Manual operation via the manual operation button
- 7-day or 24-hour heating program for the heating circuit and d.h.w.
- Remote operation via the digital room unit
- Relay and sensor test for straightforward commissioning and functional tests
- Changeover of operating mode with remote switch (via contact H1)
- Service connection facility for parameterization on site and data logging
- Holiday program

D.h.w.
- D.h.w. heating with charging pump
- D.h.w. control with sensor or thermostat
- Selectable priority for d.h.w. heating
- Choice of d.h.w. programs
- Adjustable boost of d.h.w. charging temperature
- Reduced setpoint of d.h.w. temperature
- D.h.w. discharging protection
- Automatic d.h.w. push
- Legionella function
- Heat transfer between storage tanks with a pump
- Manual d.h.w. push

Use in systems
- Communicating via Local Process Bus (LPB)
- Communicating via PPS (BMU / room unit)
- Optional heat requisition by controllers of other manufacture via potentialfree contact H1
- Optional analog heat requisition by controllers of other manufacture via DC 0…10 V signal
- Consistent system architecture with all types of RVL… and RVP... controllers
- Systems can be extended to include up to 40 heating circuits (with central bus power supply)
- Optional remote supervision
- Error messages (own faults, faults of LPB devices, faults of PPS devices)

Logging
- Burner hours run
- Number of burner starts
- Device hours run
- Pump hours run

Operating modes

Auto⊙ Automatic operation
Automatic changeover from normal to reduced temperature, or vice versa, according to the 7-day program, automatic changeover to holiday mode, demand-dependent control of the heating system (ECO function)

⊗ **Continuous operation (setback mode)**
Continuous heating to the reduced temperature, with ECO function

⏻ **Standby mode**

⌗ **Automatic d.h.w. heating**
D.h.w. heating on / off
Manual operation on / off

✍ **Manual operation** on / off

♺ **"Green" operation** on / off
In this operating mode, all nonrenewable forms of energy are unavailable and locked. Heat demand is covered exclusively by the wood-fired boiler and the solar collectors. Comfort losses, if any, will be accepted.

Frost protection is ensured in all operating modes.

Ordering

When ordering, please give type reference **RVP540** or **RVP550**. Sensors and room units, actuators and valves, if required, are to be ordered as separate items.

Equipment combinations

Suitable sensors and room units

- Flow, return, d.h.w. and solar panel temperature:
    - All types of sensors using an LG-Ni 1000 sensing element
    - Strap-on sensor QAD22
    - Immersion sensors QAE22… or QAP21.2
- Outdoor temperature:
    - Outside sensor QAC22 (sensing element LG-Ni 1000)
    - Outside sensor QAC32 (sensing element NTC 575)
- Flue gas temperature:
    - Flue gas temperature sensor FGT-PT1000 (range of use up to 400 °C)
- Room temperature:
    - Room unit QAW50
    - Room unit QAW70
    - Room sensor QAA10

Suitable actuators

The following types of actuators from Siemens HVAC Products can be used:
- 3-position actuators with running times from 0.5 to 14.5 minutes
- 2-position actuators
- Operating voltage AC 24 … 230 V

Communication

Communication is possible:
- With all LPB-compatible devices supplied by Siemens HVAC Products
- With the SYNERGYR OZW30 central unit (software version 3.0 and higher)
- Via the point-to-point interface (PPS) with BMU and the room unit

Surge protection

Conduit box AGS2S.200/109 featuring surge protection (protects solar panel sensor B6 or B61 against surges resulting from lightning).

Tool

The configuration tool, which is available on CD, enables you to easily find the application you want. The tool delivers the basic plant diagram number, the terminal assignments and the list with the major configuration parameters.
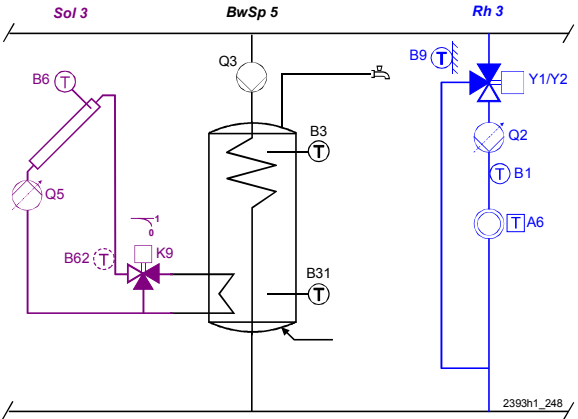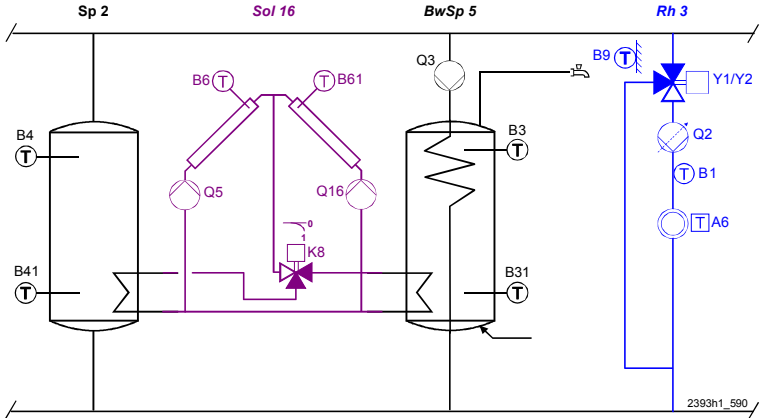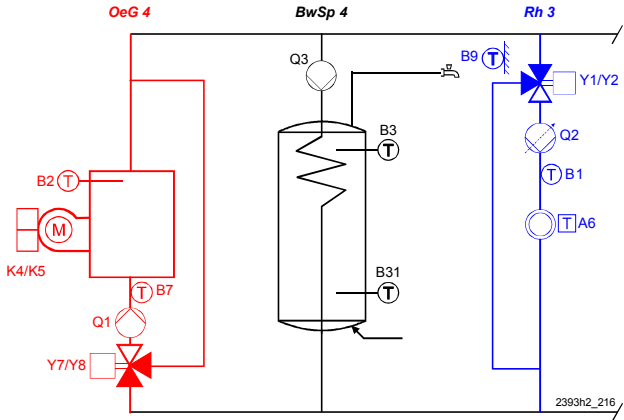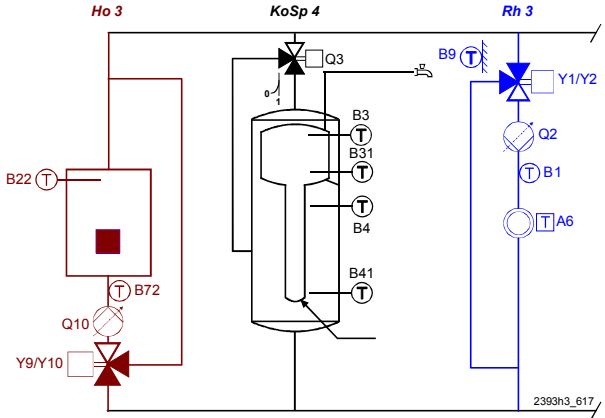There is no direct connection from the tool to the controller, which means that configurations cannot be uploaded or downloaded. To select the required type of plant, configuration parameters no. 100 through 195, which can be printed out by the configuration tool, must be adopted.
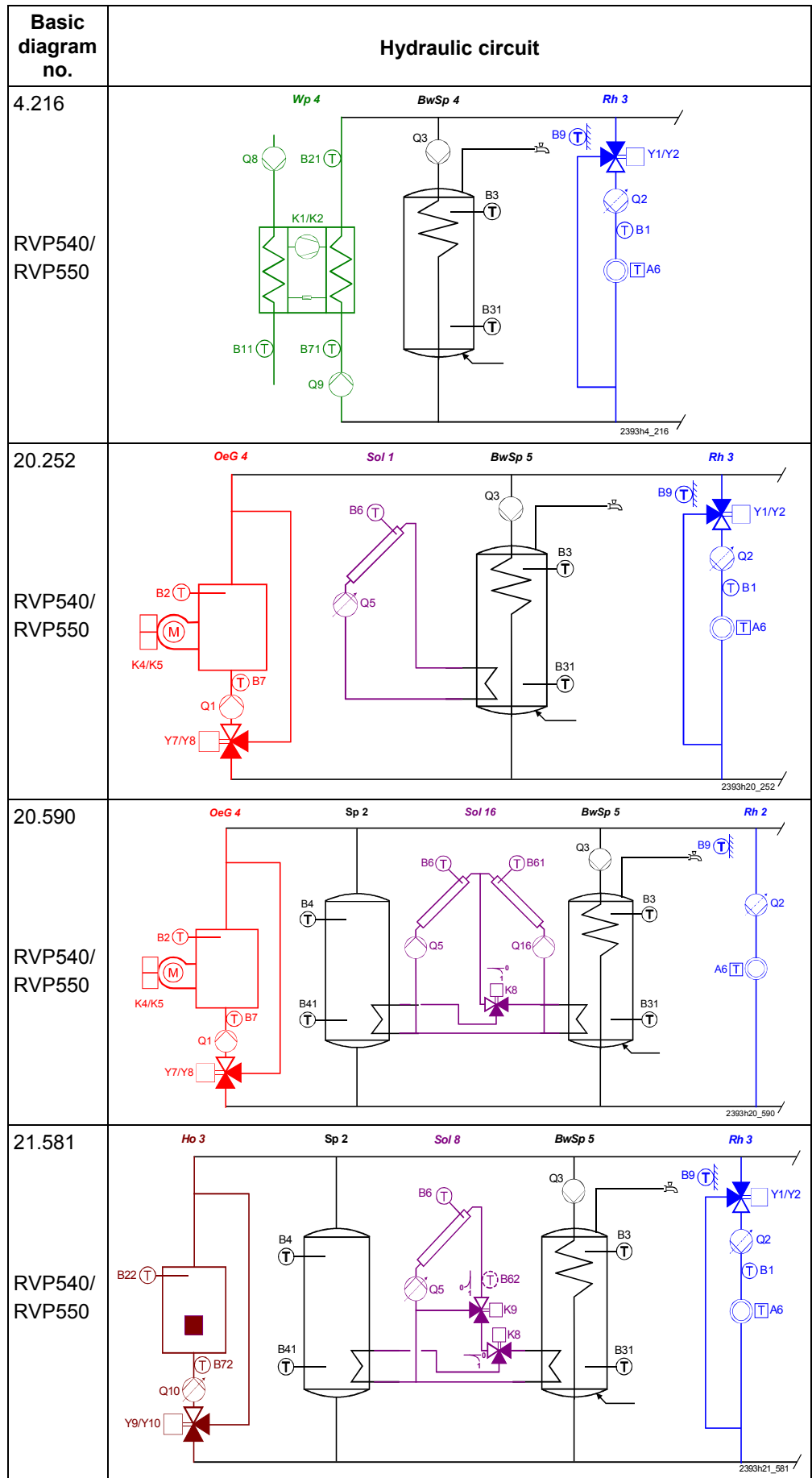The following pages show a number of examples out of a choice of more than 500 basic plant diagrams.
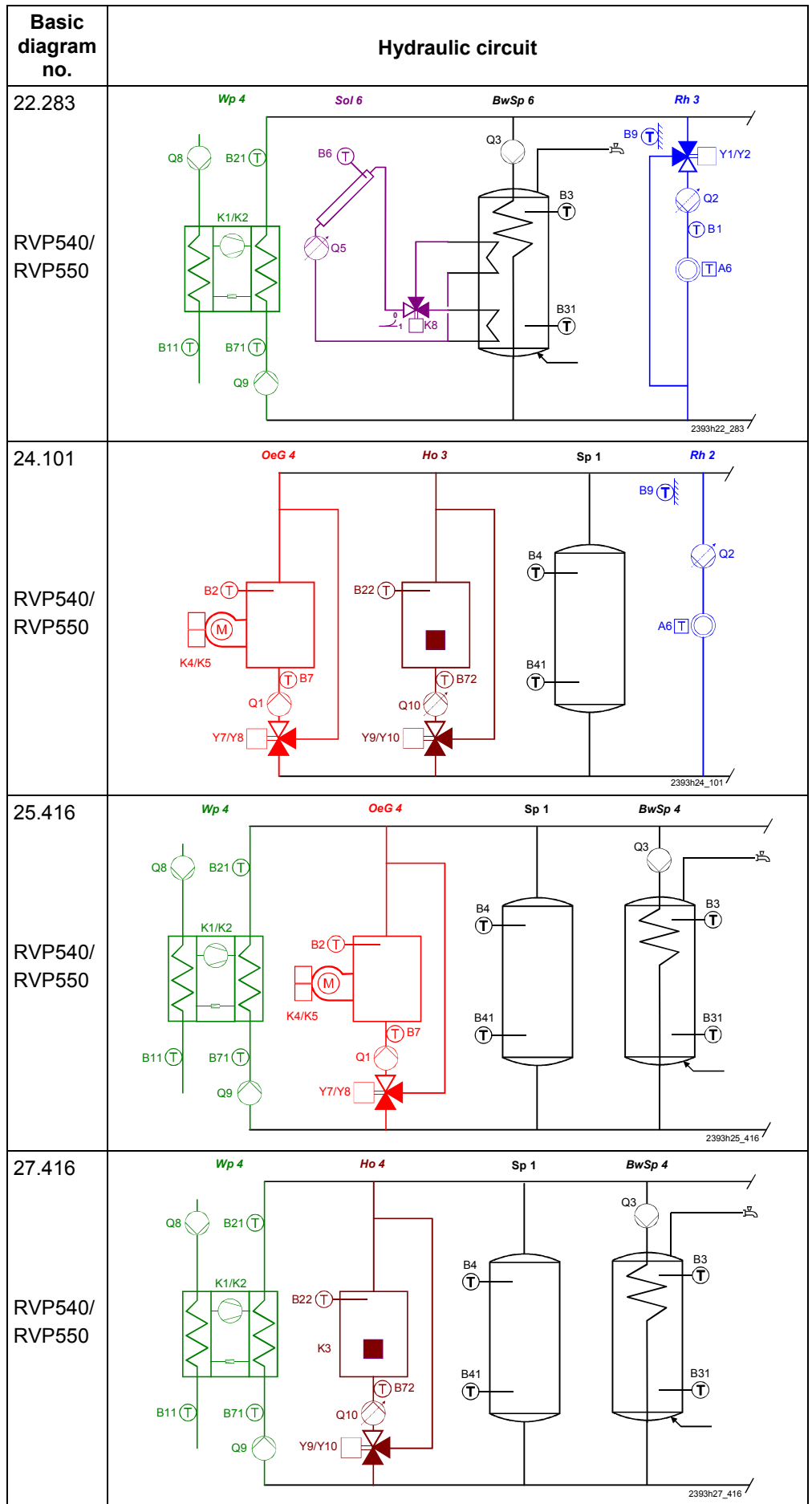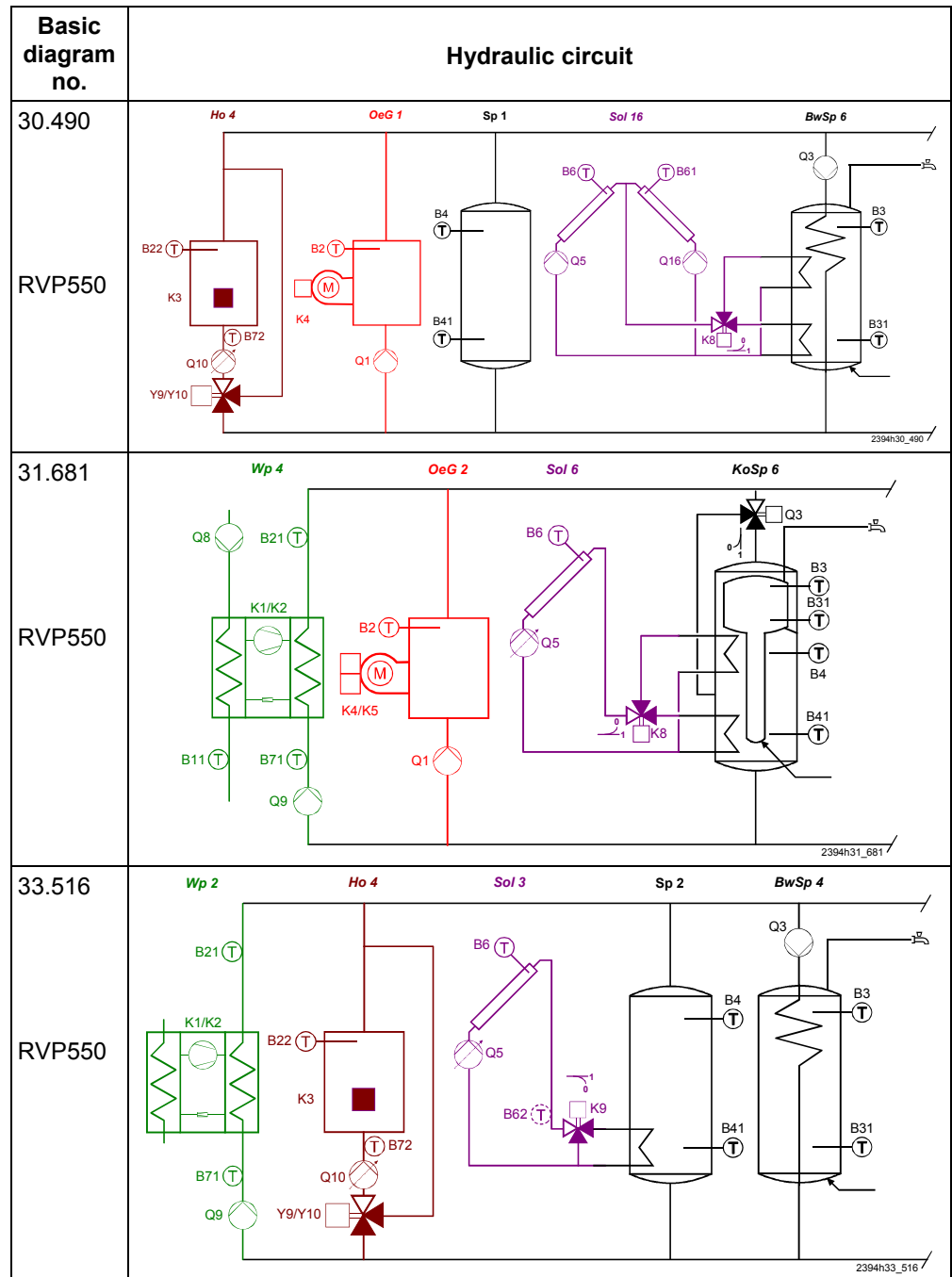
Technical design

Plant type

In view of the large number of choices, only a few combinations can be shown here. For more detailed information, refer to "Configuration and Application Manual for one or two Heat Sources", CE1P2489en, and "Configuration and Application Manual for three Heat Sources", CE1P2490en.

Basic diagram no.	Hydraulic circuit
1.248 RVP540/ RVP550	Sol 3 · BwSp 5 · Rh 3 — B6, Q5, B62, K9, Q3, B3, B31, B9, Y1/Y2, Q2, B1, A6 — 2393h1_248
1.590 RVP540/ RVP550	Sp 2 · Sol 16 · BwSp 5 · Rh 3 — B4, B41, B6, B61, Q5, Q16, K8, Q3, B3, B31, B9, Y1/Y2, Q2, B1, A6 — 2393h1_590
2.216 RVP540/ RVP550	OeG 4 · BwSp 4 · Rh 3 — B2, K4/K5, B7, Q1, Y7/Y8, Q3, B3, B31, B9, Y1/Y2, Q2, B1, A6 — 2393h2_216
3.617 RVP540/ RVP550	Ho 3 · KoSp 4 · Rh 3 — B22, B72, Q10, Y9/Y10, Q3, B3, B31, B4, B41, B9, Y1/Y2, Q2, B1, A6 — 2393h3_617

Basic diagram no.	Hydraulic circuit
4.216 RVP540/ RVP550	 *Wp 4* *BwSp 4* *Rh 3* Q8 B21 Q3 B9 Y1/Y2 K1/K2 B3 Q2 B1 A6 B11 B71 B31 Q9 2393h4_216
20.252 RVP540/ RVP550	 *OeG 4* *Sol 1* *BwSp 5* *Rh 3* B6 Q3 B9 Y1/Y2 B2 B3 Q2 B1 A6 K4/K5 Q5 B31 B7 Q1 Y7/Y8 2393h20_252
20.590 RVP540/ RVP550	 *OeG 4* *Sp 2* *Sol 16* *BwSp 5* *Rh 2* B6 B61 Q3 B9 Q2 B4 B3 B2 Q5 Q16 A6 K4/K5 K8 B41 B31 B7 Q1 Y7/Y8 2393h20_590
21.581 RVP540/ RVP550	 *Ho 3* *Sp 2* *Sol 8* *BwSp 5* *Rh 3* B6 Q3 B9 Y1/Y2 B4 B62 B3 Q2 B1 A6 B22 Q5 K9 B41 K8 B31 B72 Q10 Y9/Y10 2393h21_581

Basic diagram no.	Hydraulic circuit
22.283 RVP540/ RVP550	
24.101 RVP540/ RVP550	
25.416 RVP540/ RVP550	
27.416 RVP540/ RVP550	

Basic diagram no.	Hydraulic circuit
30.490 RVP550	 2394h30_490
31.681 RVP550	 2394h31_681
33.516 RVP550	 2394h33_516

Additional documentation

For detailed information about installation, technical design, functions and data bus (LPB), refer to the following pieces of documentation:
– Installation Instructions RVP540, RVP550: CE1G2488en
– Basic Documentation RVP540, RVP550: CE1P2488en
– Configuration and Application Manual for one or two Heat Sources, RVP540, RVP550: CE1P2489en
– Configuration and Application Manual for three Heat Sources, RVP550: CE1P2490en
– Data Sheet "Basic System Data LPB": CE1N2030E
– Data Sheet LPB: CE1N2032E
– Data Sheet "Installation of Heating Plant in Compliance with EMC Directives" CE1N2034E

The RVP5xx consists of controller insert with the electronics, power section, output relays and – on the unit front – all operating elements, and base with the connection terminals. The operating elements are located behind a cover.
The operating instructions are inserted in the cover.
The controller insert is secured to the base with 2 screws.
The RVP5xx can be fitted in 3 different ways:
– Wall mounting (on a wall, in the control panel, etc.)
– Rail mounting (on a standard mounting rail)
– Flush panel mounting (control panel door, etc.)

Analog operating elements

– Buttons for selecting the operating mode
– Buttons for d.h.w. heating ON / OFF
– Setting knob for manual room temperature readjustments
– Button for manual operation
– Button for "green" operation
– Info button

Digital operating elements

Entry or readjustment of all setting parameters, activation of optional functions and reading of actual values and operating states is made based on the operating line principle. An operating line with the 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 the operating line and one pair to readjust the display.

Energy Manager / Heating Conroller RVP540 / RVP550

Front of RVP540 and RVP550 with cover opened

2392Z54
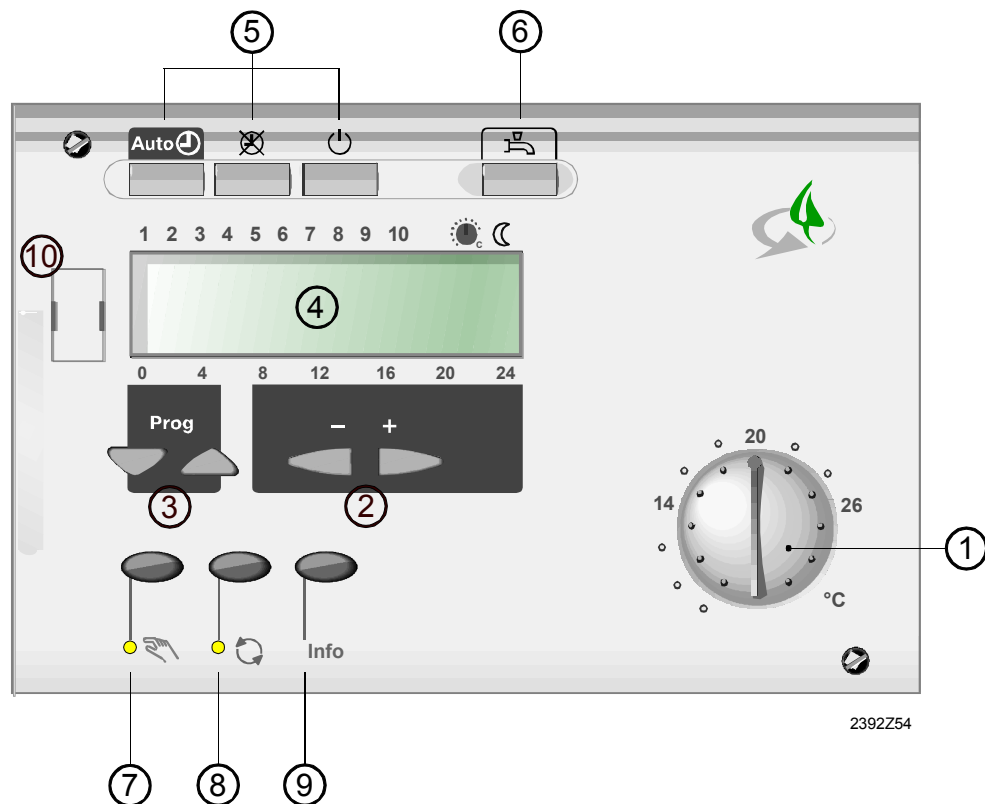
①	Setting knob for the room temperature Adjustment of the nominal room temperature setpoint	⑥	Operating mode button for d.h.w. 🚰 D.h.w. on / off Manual d.h.w. push
②	Setting buttons Setting the parameters (+ / -)	⑦	Button for manual operation with LED ✍ Manual operation on / off
③	Line selection buttons (Prog) Selection of parameters / lines	⑧	"Green" button with LED ↻ "Green" operation on / off
④	LCD Reading actual values and settings	⑨	Info button Display of plant data
⑤	Operating mode buttons for the heating circuit Choice of: **Auto**🕐 Automatic operation ⊠ Continuous operation ☉ Standby	⑩	Service connector

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Notes

Engineering

– The wires of the measuring circuits carry extra low-voltage
– The wires to the actuator and the pump carry AC 24...230 V
– The local electrical regulations must be complied with
– Sensor cables should not be run parallel to mains carrying cables for loads such as actuator, pump or burner.

Commissioning

Each unit is supplied with mounting and commissioning instructions.

Technical data

General unit data

Operating voltage	AC 230 V +10/–15 %
Nominal frequency	50 Hz (±6 %)
Power consumption	max. 10 VA
Perm. ambient temperature	
Transport and storage	-25...+70 °C
Operation	0...50 °C

Norms and standards	Product safety	
	Automatic electrical controls for household and similar use	EN 60 730-1
	Particular requirements for temperature sensing controls	EN 60 730-2-9
	Degree of protection	IP40 EN 60 529
	Safety class (if correctly mounted)	II EN 60 730
	Electromagnetic compatibility	
	Immunity	EN 50 082-2
	Emissions	EN 50 081-1
	CE conformity	
	Electromagnetic compatibility	89/336/EEC
	Low-voltage directive	73/23/EEC
Output relays	Rated voltage	AC 24…230 V
	Rated current range Q101	AC 0.02…2 (2) A
	Rated current range Q102…Q110	AC 0.02…1 (1) A
	Rated current ignition transformer	max. 1 A for max. 30 s
	Switch-on current ignition transformer	max. 10 A for max. 10 ms
Perm. cable lengths	To the sensors and to external contacts	
	Copper cable 0.6 mm^2	20 m
	Copper cable 1.0 mm^2	80 m
	Copper cable 1.5 mm^2	120 m
	To the room unit (PPS)	
	Copper cable 0.25 mm^2	25 m
	Copper cable 0.5 mm^2	50 m
	Cable lengths for LPB copper cable 1.5 mm^2, 2-wire, nonexchangeable	
	With controller bus power supply (per controller)	250 m
	With central bus power supply	460 m
	Bus loading number	E = 3
Inputs	Sensor input B101	NTC 575 (QAC32) or Ni 1000 (QAC22)
	Sensor inputs B102...B109	LG-Ni 1000 (QAE22) or LG-Ni 1000 (QAP21.2) or Pt 1000 (FGT-PT1000)
	H1 as contact input with safety extra low-voltage (SELV)	U_{H1} = 12...24 V (contact open) I_{H1} = 2...5 mA (contact closed)
	H1 as an analog input with safety extra low-voltage (SELV)	U_{in} = (DC 0...10) V R_{in} = 100 kΩ max. rating DC 20 V; 20 mA
	AC 230 V mains input (E1)	input signal range AC 0…230 V (+10 %) detection of passive input: U_{ein} ≤ AC 10 V or input dead detection of active input: U_{ein} ≥ AC 100 V input resistance R_{ein} > 100 kOhm galvanic separation (optocoupler)
Outputs	PWM output P1	signal frequency f = 2.4 kHz output voltage V_{out_high} = +11.5 V...+13 V (no load) V_{out_low} < +0.5 V

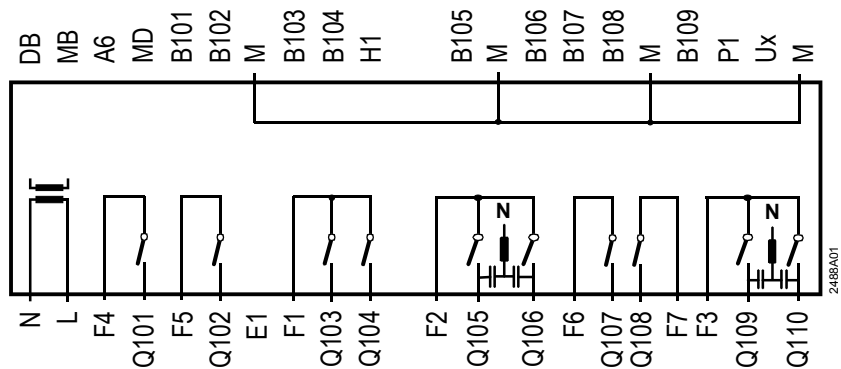|		
	output resistance	R_{out} = 1300 Ohm
	degree of modulation	g = 3 % ... 97 %
	output is short-circuit-proof	
Analog output U1	output voltage	U_{out} = 0 ... 10.0 V
	current	
	±2 mA RMS; ±2.7 mA peak	
	ripple $\leqq$ 50 mVpp	

Connection terminals

Low-voltage side
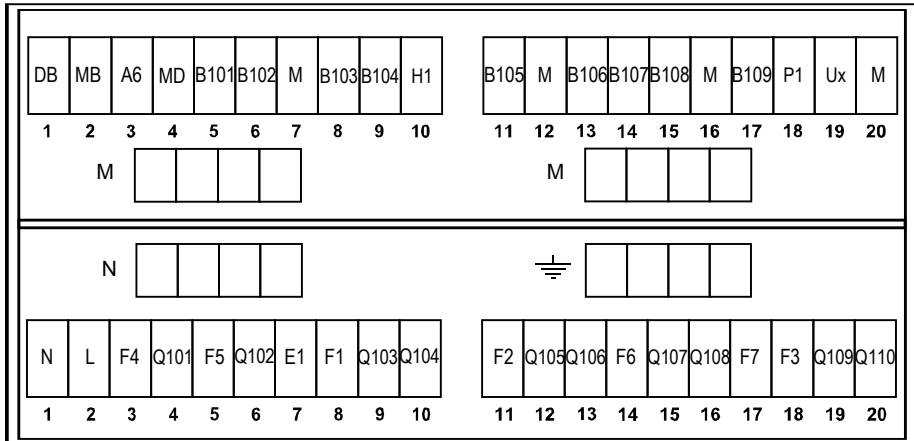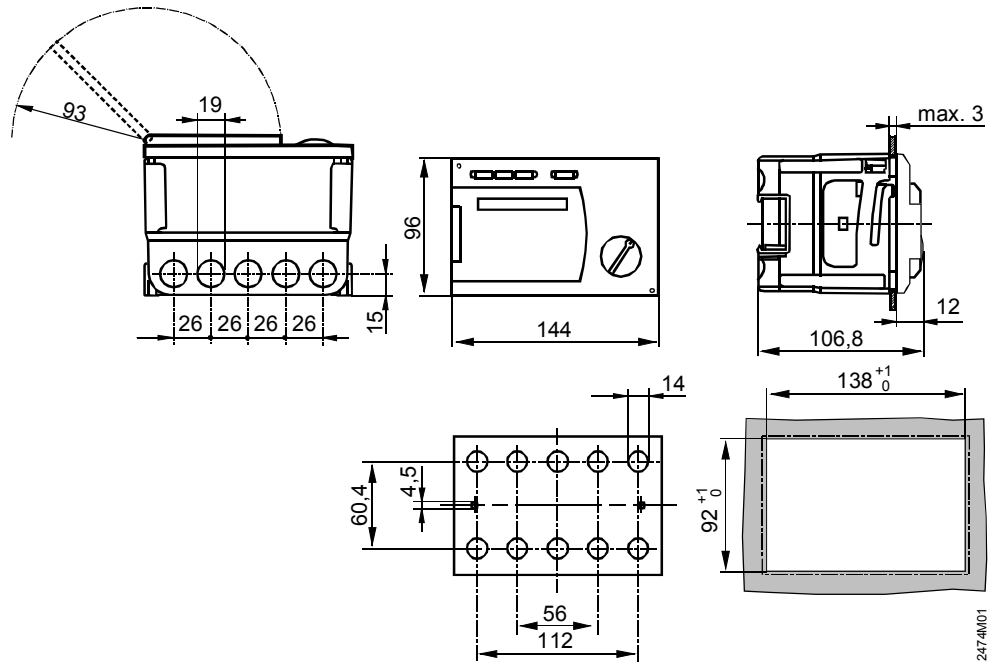
Mains voltage side

Electrical connections

Connection diagram

According to the basic plant diagram that can be selected with the configuration tool or with the help of the application manuals, for 1 or 2 heat sources: RVP540: CE1P2489de, or for 3 heat sources RVP550: CE1P2490de.

Dimensions

2474M01

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HVAC Products   27.06.2002

Subject to change

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