



Temperature Controller (Heat Pumps)

RWD31
RWD41

For comfort control in HVAC systems

Stand-alone electronic temperature controller
Four 2-position (On/Off) outputs
Easy adjustment of parameters via potentiometers
LED indicators for heating and cooling demand
DIN rail or panel mount

Use

The RWD31 and RWD41 controllers are intended for Heating, Ventilating and Air-conditioning systems including Heat Pumps.

Control equipment

- Single or dual compressor Heat Pumps
- Single or dual stage heating and cooling equipment

Functions summary

- Stand-alone controller with four 2-position(On/Off) outputs
- One main temperature sensor (Ni 1000) input
- One auxiliary input for remote setpoint adjustment
- One digital input D1 for standby (On/Off) mode

Type summary

Input		Output	Supply Voltage	Type
Analog	Digital	2-position		
2	1	4	AC 230 V	RWD31
2	1	4	AC 24 V	RWD41

Accessories

Name	Type
Protective single enclosure for wall mounting	ARG62.21
Protective multiple enclosure for wall mounting	ARG62.22
Time Clock	SEH62.1
Transformer (30VA)	SEM62.1 & SEM62.2

Equipment combinations

The following units can be connected to RWD31 and RWD41 controllers.

Units	Data sheet no.
Sensors with Ni1000 temperature sensing element	17... to 18...
Room temperature sensor with setpoint adjuster QAA25 or QAA25/AP	1721 / 1748
Remote setting unit FZA21.11	1981
Siemens actuators with 2-position input	45... / 46...
Other equipment with 2-position input Examples: compressors, electric heaters,...	

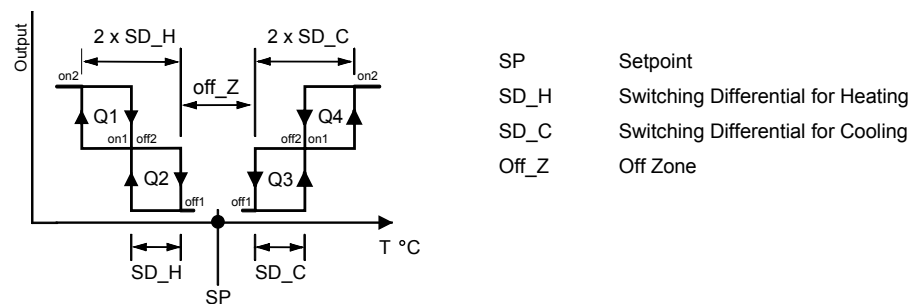
Other combinations with third party units are possible, provided input and output specifications match the RWD31 and RWD41.

Functions

Main function

The input B1 detects the actual temperature and compares it with the setpoint. Depending on the deviation, the controller acts accordingly with its outputs to achieve the desired setpoint.

The RWD31 and RWD41 controllers have the following output configuration.



Q1 = Heating stage 2 (Reverse acting) Q3 = Cooling stage 1 (Direct acting)
 Q2 = Heating stage 1 (Reverse acting) Q4 = Cooling stage 2 (Direct acting)

Input B1

The input B1 is used for Ni 1000 temperature sensor.

Input R1

The input R1 is used for passive remote setpoint adjuster (0...1000 Ω : 0...50°C).

Digital input D1

Digital input D1 is used to implement the standby (On/Off) mode. Changeover occurs via potential-free contact between D1-GND.

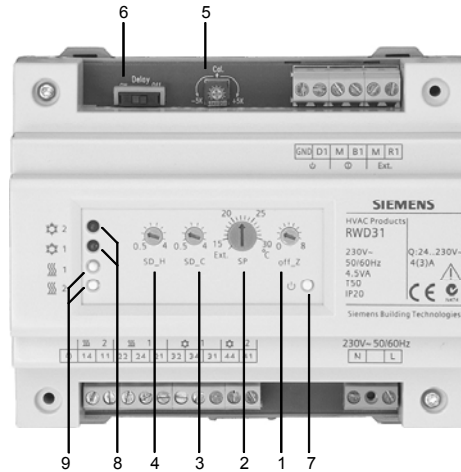
Delay times

The outputs have fixed delay times to protect equipment from switching On/Off too frequently.

Set delay switch to ON position	Delay
Changeover delay (heating demand ↔ cooling demand)	120s
Inter-stage delay from stage 1 ⇒ stage 2 (cooling & heating)	120s
Minimum off time for stage 1 & stage 2 (cooling & heating)	120s

Operating and setting elements

The RWD31 and RWD41 parameters are adjusted via potentiometers.



- | | |
|---|-----------|
| | Range |
| 1. Off Zone | 0...8K |
| 2. Setpoint | 15...30°C |
| 3. Switching differential for cooling | 0.5...4K |
| 4. Switching differential for heating | 0.5...4K |
| 5. Re-calibration sensor adjuster | -5...+5K |
| 6. Delay switch | On/Off |
| | |
| 7. Orange LED for power ON and standby mode (LED flashes) | |
| 8. Green LED for cooling demand | |
| 9. Red LED for heating demand | |

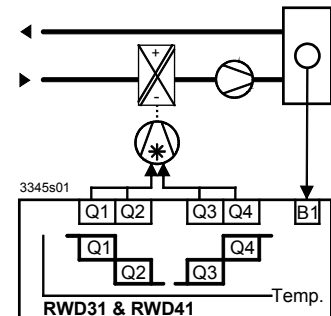
LED indicators

Applications

Example

Air conditioning plant with temperature control.
Dual compressor heat pump.

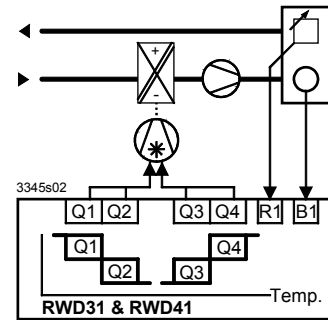
- B1 = Space temperature
- Q2 = Heating stage 1
- Q1 = Heating stage 2
- Q3 = Cooling stage 1
- Q4 = Cooling stage 2



Remote setpoint adjustment

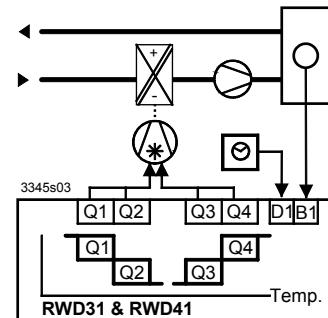
A remote setting unit (FZA21.11) or an integrated sensor with setpoint (QAA25/AP, QAA25), connected to terminals R1-M, enables remote adjustment. In this case, the controller's setpoint adjuster must be set to **Ext.** position.

Passive measurement from 0...1000 Ω corresponding range from 0...50°C.



Standby

A switch contact (via time clock, thermostat) between digital input D1-GND is used to enable the standby mode. During standby mode, all Q outputs are OFF.



Mechanical Design

Housing

The RWD31 & the RWD41 temperature controllers are as per DIN 43 880 Gr. 1 requirements.

Protective housing ARG62.21/ARG62.22

A protective housing is used to protect the controller when mounted outside a control panel, such as on ducts, walls and in plant rooms. Furthermore, the protective housing prevents inadvertent contact with voltage supplying parts such as the connecting terminals.

The RWD31 or RWD41 clips into the protective housing.

The cable entries are located at the top and the bottom of the protective housing.

The front has an opening for the adjustment potentiometers.

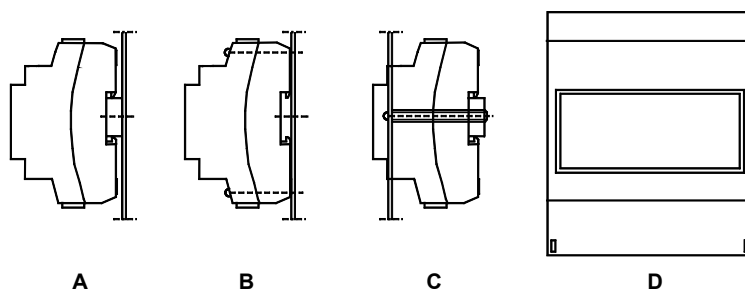
Terminals

Screw terminals

Installation notes

The RWD31 and RWD41 controllers can be mounted as follows:
Observe all local installation and mounting regulations.

- A On a DIN rail (EN 50 022-35 x 7.5) at least 120 mm long
- B Wall mounted with 2 screws
- C Front mounted using standard elements.
e.g. 1x DIN rail 150 mm long, 2x hexagonal placeholders 50 mm, washers and screws
- D In the ARG62.21/ARG62.22 protective housing



Electrical installation

Standard cables can be used for the controller. However, when mounting in an environment greatly exposed to EMC, use only shielded cables.



- The RWD31 is designed for AC 230 V operating voltage.
- The RWD41 is designed for AC 24 V operating voltage.

The low voltage must comply with the requirements for safety extra-low voltage (SELV) as per EN 60730.

Use safety insulating transformers with double insulation as per EN 60742; they must be designed for 100 % on-time.

When using several transformers in one system, the connection terminals G0 must be galvanically connected.

Supplying voltages above AC 24 V to low voltage connections may damage or destroy the controller or any other connected devices. Additionally, connections to voltages exceeding AC 42 V endanger personnel safety.

Engineering notes




The sections marked with a warning symbol contain technical safety requirements and restrictions. Observe all of these warnings as they directly relate to the protection of personnel and equipment.

Technical data

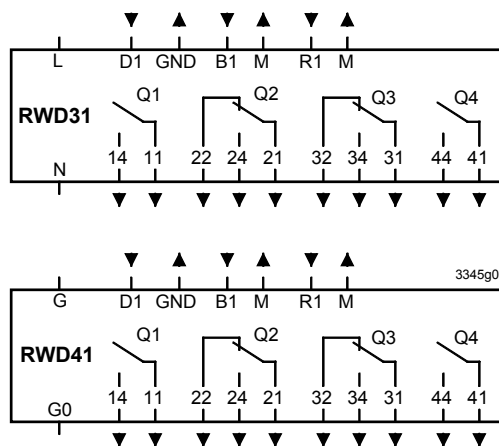
General data


Power supply	Operating voltage RWD31	AC 230 V +10 % -15%
	Operating voltage RWD41	AC 24 V ±20 %
	Safety extra-low voltage (SELV) as per	EN 60730
	Frequency RWD31	50 Hz/60 Hz
	Frequency RWD41	50 Hz/60 Hz
Power consumption	RWD31	4.5 VA
	RWD41	3 VA
Environmental conditions	Transport	IEC721-3-2
	Climatic conditions	Class 2K3
	Temperature	-25...+70 °C
	Humidity	<95 % r.h.
	Mechanical conditions	Class 2M2
Environmental conditions	Operation	IEC721-3-3
	Climatic conditions	Class 3K5
	Temperature	0...+50 °C
	Humidity	<95 % r.h.
IP code	Housing	IP 20 as per EN 60529
	Front	IP 20 as per EN 60529
	Front and with ARG62.2..	IP 30 as per EN 60529
Product standards	Automatic electrical controls for household and similar use	EN 60730
	CE conformity	In accordance with European Union directives
	Electromagnetic compatibility EMC	89/336 EEC
	Low voltage directive	73/23 EEC

	Emissions	EN 50081-1
	Immunity	EN 50082-1
	Safety	EN 60730
Other international approval	C tick compliance	 N474
Terminals	Screw terminals for cables with	min. 0.5 mm dia. max. 2 x 1.5 mm ² or 2.5 mm ²
Weight without packaging	RWD31	0.410 kg
	RWD41	0.320 kg
Analog input B1 Ni 1000 Ω at 0 °C	Controller setpoint range	15...30°C
	Max. cable length for dia. 0.6 mm	max. 300 m
Remote setpoint R1	Range	0...1000 Ω corresponding to adjustable range from 0...50 °C
	Max. cable length for dia. 0.6 mm	max. 300 m
Digital input D1	Polling voltage for control commands (D...GND)	DC 24V
	Current consumption	<5 mA
Digital outputs Q's	Relay contacts (potential-free)	
	Voltage	AC 24...230 V
	Maximum rating	AC 230 V, 4 A resistive, 3 A ind. (per relay terminal) DC 30 V, 4 A
	Minimum rating	AC 19.2 V, 20 mA DC 5 V, 100 mA

Diagrams

Internal diagrams

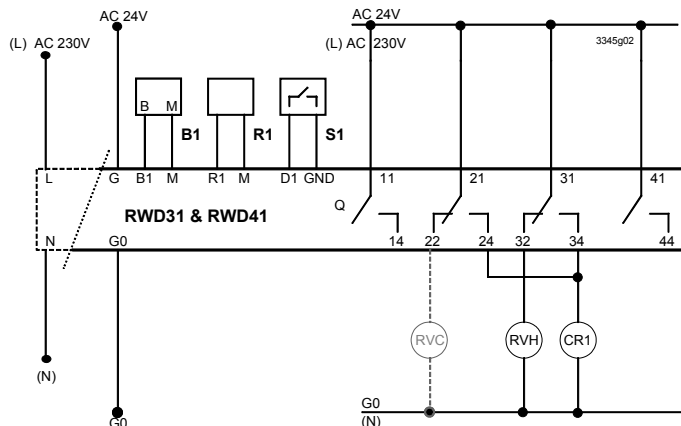


- D1 Digital input
L, N AC 230 V supply (For RWD31)
G, G0 AC 24 V supply (For RWD41)
( SELV AC 24 V Power supply)
M Ground (G0) for signal inputs
Q... Digital output, various voltages permissible AC 24...230 V
B1 Signal input (Main input: Ni 1000)
R1 Signal input (Aux. input: 0...1000 Ω remote setting unit, QAA25/AP, QAA25)

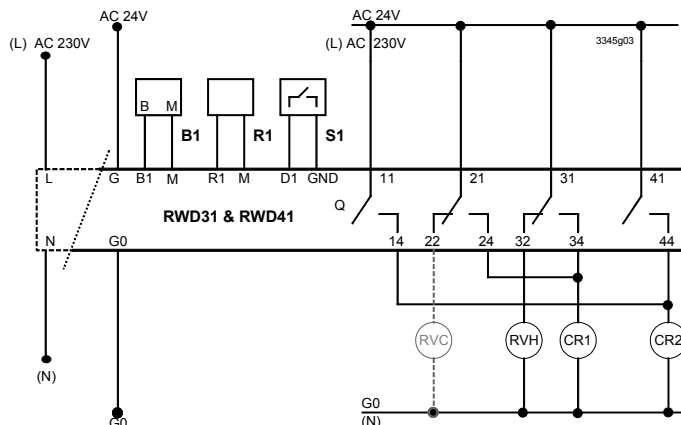
Note: M, GND, G0 are internally connected

Connection diagrams

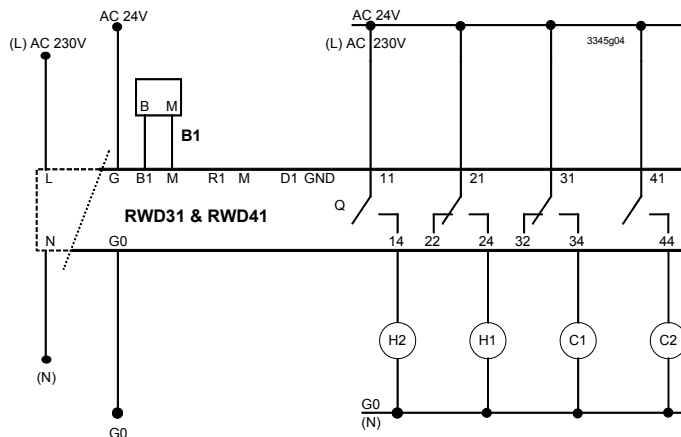
Single compressor Heat Pump + remote setting unit + switch



Dual compressor Heat Pump + remote setting unit + switch



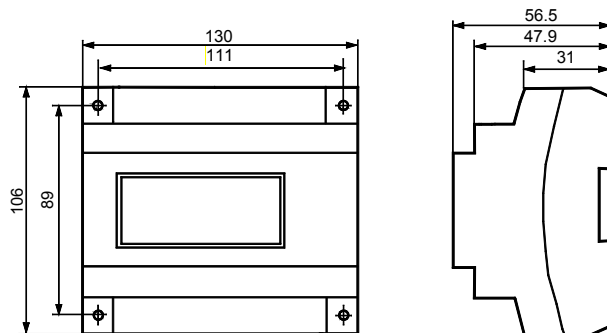
Two-stage of heating and cooling



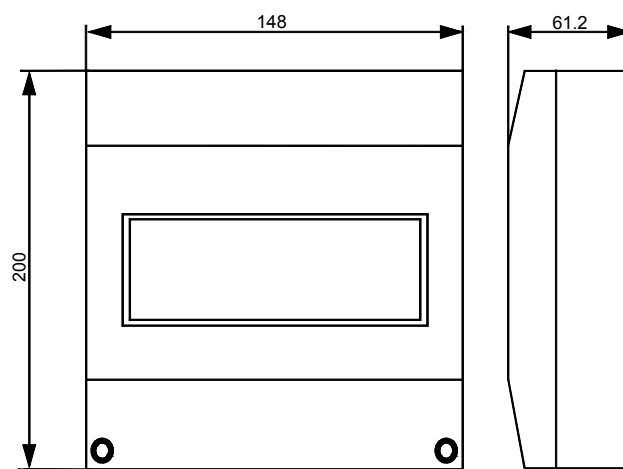
- CR1 Compressor 1
- CR2 Compressor 2
- RVC Reversing valve in cooling demand
- RVH Reversing valve in heating demand
- H1 Heat 1
- H2 Heat 2
- C1 Cool 1
- C2 Cool 2
- B1 Main temperature sensor
- R1 Remote setting unit (optional)
- S1 Time clock or switch (optional)

Note: The reversing valve for the heat pump can be energised in heating or cooling demand. It depends on the heat pump equipment internal circuitry.

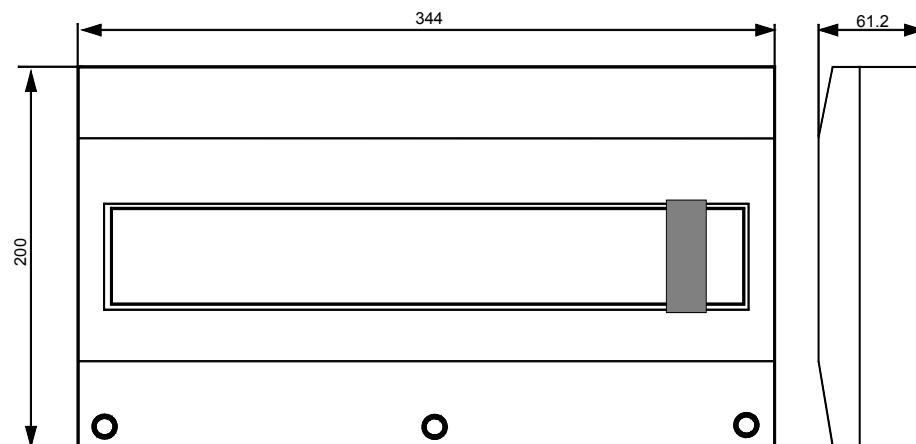
Dimensions



RWD31 & RWD41



ARG62.21



ARG62.22