SIEMENS

3098

Multi-loop Controllers

RDV62
RDV69

Multi-loop control for CAV, VAV, Air/Water, Room Controls HVAC systems

- **Temperature control for 2-pipe HVAC systems**
- **Independent Universal PID control & Binary control (3-stage)**
- **Internal or external temperature sensor input**
- **Universal input (e.g. DC 0…5 V, DC 0…10 V or 0…20 mA)**
- **Digital input (Open Contact to Ground)**
- **Modulating analog output (e.g. DC 0...10 V or 0…20 mA)**
- **Monitoring and programmable alarms for low & high limits on all inputs**
- **Feedback function for temperature input, set points or floating output**
- **Special functions on external input: remote window contact, remote energy saving, auto H/C changeover and alarm inputs, summer and winter compensation, etc.**
- **Password protected programmable user and control parameters**
- **Light blue backlight and selection of display when idle**
- **Optional: single speed fan or ECM fan DC 0…10 V**

Use

RDV Multi-loop controllers are stand-alone temperature & universal controller with two autonomous control loops which performs both primary and auxiliary control functions. The outputs need to be assigned to the control sequences by SW parameters. The respective mode is defined by entering the corresponding configuration and setting parameters via the push buttons on the controller with simple steps. All control applications and SW parameters can be set on the RDV units with password protection. No special tool or PC software is required.

RDV62 has control loops for up to 2 PID sequences and it features with both internal and external sensors (B1, use Siemens NTC temperature sensors only) with 1 analog input (X1), 1 digital input (D1) and 2 analog output (Y1 & Y2) for various control applications.

RDV69 has control loops that can utilize 3 binary and 2 PID control sequence functions. The RDV69 can employ both internal and external sensors (B1, use Siemens NTC temperature sensors only) with 1 analog input (X1), 2 digital outputs (Q14 & Q24) and 1 analog output (Y1) for various control applications.

Typical HVAC Applications

- Air/Water Systems:
  Air Handling Units for 2-pipe or 4-pipe systems with options of:
  - Humidify control
  - Pressure control
  - Radiator control, chilled ceiling

- Air Only Systems:
  Constant or Variable Air Volume (CAV, VAV) single duct with options of:
  - Up to two reheat stages
  - Supply air, extract air cascade control
  - Humidity control
  - Single fan or ECM fan control

- Water Only Systems:
  Radiator & chilled ceiling

- Analog interface for building automation, individual room control for hotel rooms & meeting rooms, etc.

Function Summary

- **Controller**
  Stand-alone controller with 2 PID loops and up to 3 stage binary outputs, one temperature sensor input, one universal input, one digital input, up to 2 universal output, 3 staged binary output and two floating binary outputs. E.g. General alarm functions, compensation and averaging functions for input signals. General alarm functions, control loop assignment, programmable activation time, delay and hysteresis for output signals.

- **Control loops LP1 & LP2 for the following functions**
  LP1: temperature control loop with either internal or external temperature sensor
  LP2: universal control loop with universal input
  RDV may utilize 6 binary output and 2 PID control sequence functions. Control sequences will be activated once assigned to a physical / logical output.
  Various functions: Set point shift & Limits, Summer – winter compensation, Proportional control, Integral & differential control, 2 pipe systems, VAV function, etc.

- **External temperature Input B1 for the following functions**
  Occupation sensor for comfort/energy saving/OFF
  Programmable heat/cool changeover by open contact
  Auto heat / cool changeover via supply temperature and adjustable limits
  Activation delay

- **Universal input X1 for the following auxiliary functions**
  Configurable to 0…10 V, 0…5 V or 0…20 mA via jumper setting
  Programmable display ranges and limits

- **Binary input D1 for the following functions**
  Programmable switching action
  Toggling between Comfort and Energy Saving (or OFF)
  Remote switching or window contact
  Manual or auto heating and cooling changeover input

- **Universal output Y1, Y2 for the following functions**
  Configurable to 0…10 V or 0…20 mA via jumper settings
  Manual output settings
  Dehumidifying (4-pipe systems with humidity sensor)
  Feedback of floating output function
  VAV control function

- **Binary output Q14 & Q24 for the following functions**
  Dehumidifying (4-pipe systems with humidity sensor)
  Programmable operation states with time delay
  Selection of three stage actions
  Indication of the fan symbol
  Configurable to floating output functions

Type Summary

Inputs		***Outputs***		***Supply Voltage***	***Type***
Analog	Digital	Analog	Digital		
2	1	2	0	AC 24 V	RDV62
2	0	1	2	AC 24 V	RDV69

Ordering

When ordering, please indicate both product ASN number and name:

ASN	***SSN***	***Product Name***
RDV62	S55770-T168	AC 24 V Multi-Loop Controller with Two Modulating Outputs
RDV69	S55770-T169	AC 24 V Multi-Loop Controller with Two Binary Outputs and One Modulating Output

Note: ☞ *Please order NTC sensors, valves and actuators separately.*

Equipment Combinations

Please use **only** Siemens NTC temperature sensors of the following units below:

	Part Number	*Types*	*Data sheet No.*
	QAA2030	Room temperature sensor	CE1N1745en
	QAD2030	Strap-on temperature sensor	CE1N1801en
	QAE2130.010	Immersion Temperature sensor	CE1N1781en
	QAE2130.015	Immersion Temperature sensor	CE1N1781en
	QAM2130.040	Duct Temperature sensor	CE1N1761en

Note: ☞ *ON/OFF and universal types of dampers, valves and actuators are available and please refer to Siemens catalogue for more information.*

Power Failure

Upon power interruption, all parameters and set point values are saved in non-volatile memory (UP05).

Error Messages

Err1: The external temperature sensor faulty. All outputs connected to this sensor will be set to off mode. Sensor feedback signals will be set in alarm mode.

Err2: The internal temperature sensor faulty. All outputs connected to this sensor will be set to off mode. Sensor feedback signals will be set in alarm mode.

Note: ☞ *RDV62 and RDV69 have different number of digital and analog IO. Therefore, not all the described functions in the following sections (Function, Input Configuration and Output Configuration) are available for both RDV62 and RDV69 (but just for either RDV62 or RDV69). Users are recommended to review their technical data sections for available terminals of the required inputs or outputs.*

Mechanical Design:

Housings

RDV62 & RDV69 has the same housings which consist of a power module and a front module. The power module is used for all wirings and connections to other equipments. Also, the power module has jumper settings for input/output configuration. The front module has two parts – the mounting plate and the logic front cover with LCD display. The mounting plate and the logic front cover will normally be delivered separately while the power module will be pre-assembled with the mounting plate of the front module. The pre-assembled mounting plate and power module can be wired and installed in the conduit box if there is no jumper setting change (Please check default settings).

If jumper settings are required to be changed, installers will have to separate the mounting plate and the power module. Then, put them back together then continue the installation.

Mounting Options

The RDV multi-loop controllers can be mounted as follows:

- Semi-flush wall mounted in a standard China conduit box
- Front mounting with any opening similar to the dimensions of the standard China conduit box, e.g. customer panel for equipment installations

Engineering notes:

Intended use

Use these controllers only for applications as described in the description on the title page (bold print) and the section "Use". Additionally, observe all conditions and restrictions imposed in this section and in "Technical data".

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.

Warning

- **G & G0 Terminals**
  G is for AC 24 V live terminal while G0 is for AC 24 V ground terminal.
  Mis-wiring of these two terminals can cause damage to the RDV unit.

- **Device Isolation**
  Power supply is half-way rectified, i.e. Signal Ground = Power Ground
  Strong recommendation of using an isolation transformer where it is appropriate.

- **Risk of Electrical Shock**
  More than one disconnect switch may be required to de-energize the equipment before servicing.

- **Fail Safe Operation**
  Whenever the unit is switched OFF, all outputs will be turned OFF automatically.

- **Frost Protection**
  The frost protection can be set up through alarm functions and low / high limits of the control inputs.

Disposal notes

The controller contains electrical and electronic components and must not be disposed of together with household waste.

Local and currently valid legislation must be observed!

Installation Notes

For detailed information about installation, please refer to document: CB1M3097.

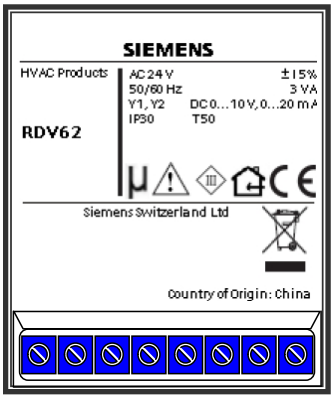
Warning

Ensure LIVE voltages are disconnected from all terminals before changing jumper settings.

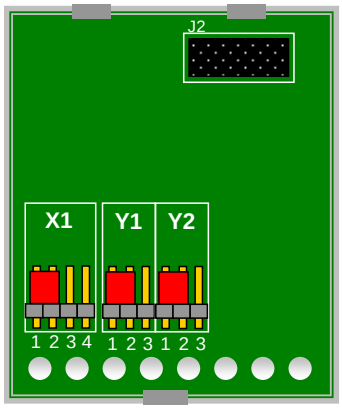
Connection Terminals and Jumpers

RDV62

Rear View Of RDV62 Power Module



Front View Of RDV62 Power Module



Terminal Description:

1. G0 Ground Reference for AC 24 V
2. G AC 24 V input
3. Y1 Analog output 1
4. Y2 Analog output 2
5. D1 Digital input
6. X1 Universal input
7. B1 Sensor input
8. G0 Ground Reference for AC 24 V

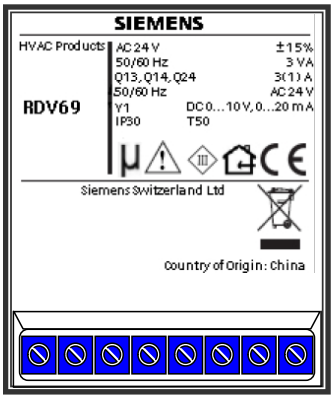
Jumper Settings:

1. Y1 / Y2
   Pos 1-2: voltage output (0…10 V), ***factory default***
   Pos 2-3: current output (0…20 mA)

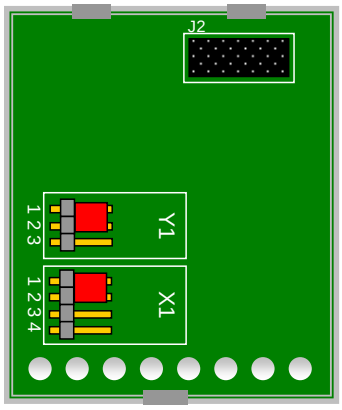
2. X1
   Pos 1-2: voltage input (0…10 V), ***factory default***
   Pos 2-3 or Open: voltage input (0…5 V)
   Pos 3-4: current input (0…20 mA)

RDV69

Rear View Of RDV69 Power Module



Front View Of RDV69 Power Module



Terminal Description:

1. G0 Ground Reference for AC 24 V
2. G AC 24 V input
3. Q13 Relay input
4. Q14 Relay output 1
5. Q24 Relay output 2
6. Y1 Analog output
7. X1 Universal input
8. B1 Sensor input

Jumper Settings:

1. Y1
   Pos 1-2: voltage output (0…10 V), ***factory default***
   Pos 2-3: current output (0…20 mA)

2. X1
   Pos 1-2: voltage input (0…10 V), ***factory default***
   Pos 2-3 or Open: voltage input (0…5 V)
   Pos 3-4: current input (0…20 mA)

Parameter List

User Parameters (UP) (Password 008)

RDV62 & RDV69

Parameter	Description	Range	Deafult Value
UP 00	Enable change of operation modes	ON, OFF	ON
UP 01	Enable change of setpoints	ON, OFF	ON
UP 02	Enable manual control of fan speeds	ON, OFF	ON
UP 03	Enable change of heating/cooling mode	ON, OFF	ON
UP 04	Enable change of time programs	ON, OFF	ON
UP 05	State after power failure:0 = OFF, 1 = ON, 2 = Last State	0, 1, 2	2
UP 06	Enable energy saving functionality	ON, OFF	ON
UP 07	Celsius or Fahrenheit, ON = Fahrenheit, OFF = Celsius	ON, OFF	OFF (°C)
UP 08	Display mode while no key is pressed ON = Standard display; OFF = Selected display	ON, OFF	ON
UP 09	Select contents of Large LCD display in standard mode: 00 = OFF 01 = Setpoint Temperature HC 02 = Setpoint Universal 1 03 = Int. Temperature Input 04 = Ext. Temperature Input 05 = Analog Input 06 = Humidity Input (-H only) 07 = Analog Output 08 = Floating Output 09 = Clock	0…9	3
UP 10	Select contents of small LCD display in standard mode 00 = OFF 01 = Setpoint Temperature HC 02 = Setpoint Universal 1 03 = Int. Temperature Input 04 = Ext. Temperature Input 05 = Analog Input 06 = Humidity Input (-H only) 07 = Analog Output 08 = Floating Output 09 = Clock	0…9	1
UP 11	Select contents of vertical LCD display in standard mode 00 = OFF 01 = Analog Input 02 = Humidity Input 03 = Analog Output 04 = Floating Output	0…5	3
UP 12	ON = Display heating & cooling state in standard mode OFF = Show heating and cooling while output is active	ON, OFF	OFF

Control Parameters (CP) (Password 238)

RDV62

RDV62 Module	Descriptions
1L	Loop 1: Heat/Cool: Temperature Input 1 (LP1)
2L	Loop 2: Universal: Analog Input (LP2)
IP	Input configuration (B1, X1, D1)
OP	Output configuration (Y1, Y2)

RDV69

RDV69 Module	Descriptions
1L	Loop 1: Heat/Cool: Temperature Input 1 (LP1)
2L	Loop 2: Universal: Analog Input (LP2)
IP	Input configuration (B1, X1)
OP	Output configuration (Y1, Q14, Q24)

Technical Data

RDV62

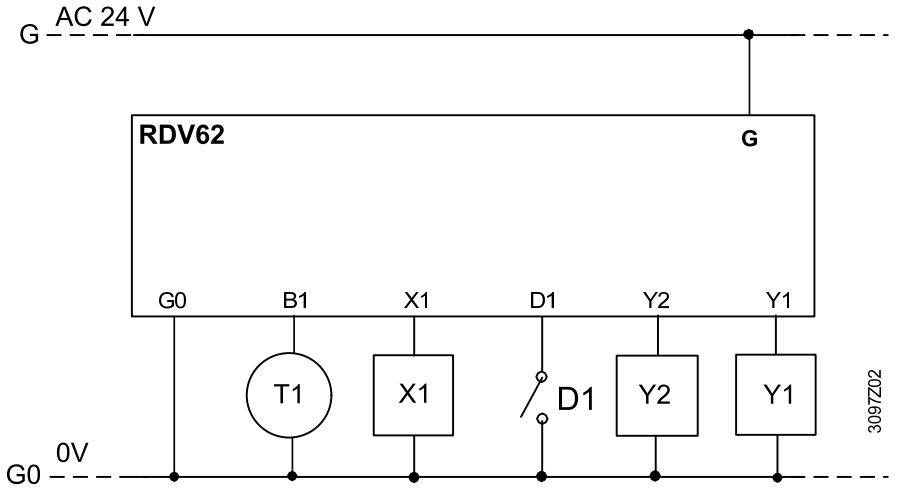
Power Supply	Operating Voltage	AC 24 V ±15%, 50…60 Hz
	Power Consumption	Max. 3 VA
	Internal rectification: Signal ground = power ground	Half Wave Rectified Isolation transformer required
	Electrical Connection	Terminal Connectors, wire 0.34…2.5 mm^2 (AWG 24…12)
Signal Inputs	Temperature Inputs Range Accuracy	B1 Int. NTC: 0…50 °C (32…122 °F) Ext. NTC: -40…140 °C (-40…284 °F) Int. NTC: 0.2 K Ext. NTC: refer to selected sensor types
	Analog Inputs Input Signal Resolution Accuracy	X1 DC 0…10 V or 0…20 mA 9.76 mV or 0.019 mA (10 bits) ±2%
	Binary Input Input Signal	D1 Open Contact to Ground
Signal Outputs	Analog Outputs Output Signal Resolution Accuracy Maximum Load	Y1, Y2 DC 0...10 V or 0…20 mA (Max. 300 Ω) 9.76 mV resp. 0.019 mA (10 bit) ±1% 20 mA, Max. 500 Ω
Environment	Operation Climatic Conditions Temperature Humidity	To IEC 721-3-3 class 3 K5 0…50 °C (32…122 °F) <95% r.H. non-condensing
	Transport & Storage Climatic Conditions Temperature Humidity Mechanical Conditions	To IEC 721-3-2 and IEC 721-3-1 Class 2 K3 and class 1 K3 -25…70 °C (-13…158 °F) <95% r.H. non-condensing Class 2M2
Standards	CE In accordance with European Union directives EMC Standard LVD Standard	EN 61 000-6-1 / EN 61 000-6-3 2004/108/EC 2006/95/EEC
	Product standards Automatic electrical controls for household and similar use Special requirement on temperature dependent controls	 EN 60 730 –1 EN 60 730 – 2 - 9
	Degree of Protection	IP30 to EN 60 529
	Safety Class	III (IEC 60536)
Housing	Materials Front & Power Module LCD Cover Lens	 Fire proof ABS plastic (UL94 class V-0) PC
General	Dimensions(Width x Height x Depth) Front Module Power Module	 86mm (W) x 86mm (H) x 14mm (D) 49mm (W) x 62mm (H) x 25mm (D)
	Weight Unit Only Overall Package	 117.3 g 185.4 g

RDV69

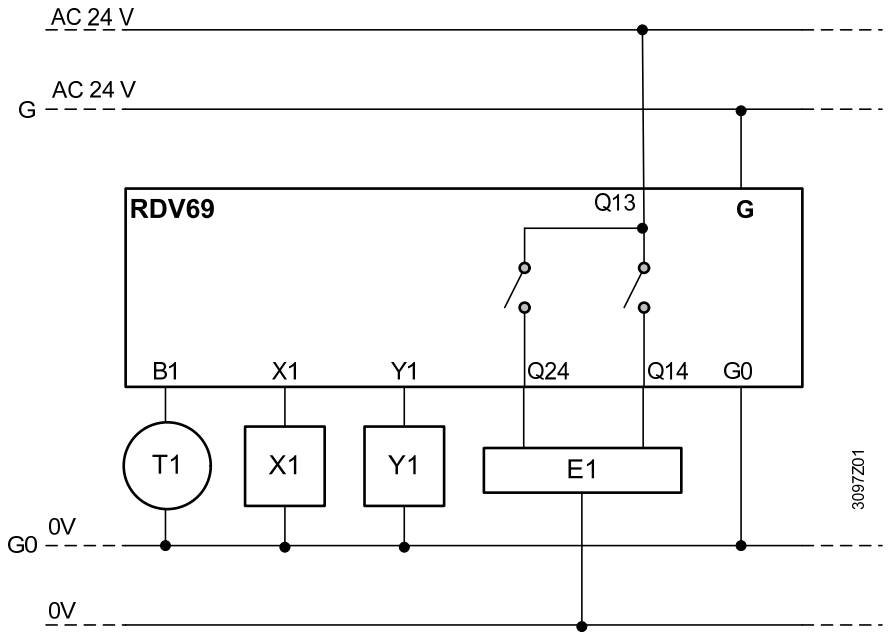
Power Supply	Operating Voltage	AC 24 V ±15%, 50…60 Hz
	Power Consumption	Max. 3 VA
	Internal rectification:	Half Wave Rectified
	Signal ground = power ground	Isolation transformer required
	Electrical Connection	Terminal Connectors, wire 0.34…2.5 mm^2 (AWG 24…12)
Signal Inputs	Temperature Inputs	B1
	Range	Int. NTC: 0…50 °C (32…122 °F)
		Ext. NTC: -40…140 °C (-40…284 °F)
	Accuracy	Int. NTC: 0.2 K
		Ext. NTC: refer to selected sensor types
	Analog Inputs	X1
	Input Signal	DC 0…10 V or 0…20 mA
	Resolution	9.76 mV or 0.019 mA (10 bits)
	Accuracy	±2%
Signal Outputs	Analog Outputs	Y1
	Output Signal	DC 0...10 V or 0…20 mA (Max. 300 Ω)
	Resolution	9.76 mV resp. 0.019 mA (10 bit)
	Accuracy	±1%
	Maximum Load	20 mA, Max. 500 Ω
	Relays Outputs	Q14, Q24
	AC Voltage	AC 24…48 V, 3 (1) A Max. each output
	DC Voltage	DC 0…30 V, 3 (1) A Max. each output
	Insulation resistance	AC 3750 V acc. to EN 60 730-1
Environment	Operation	To IEC 721-3-3
	Climatic Conditions	class 3 K5
	Temperature	0…50 °C (32…122 °F)
	Humidity	<95% r.H. non-condensing
	Transport & Storage	To IEC 721-3-2 and IEC 721-3-1
	Climatic Conditions	class 2 K3 and class 1 K3
	Temperature	-25…70 °C (-13…158 °F)
	Humidity	<95% r.H. non-condensing
	Mechanical Conditions	class 2M2
Standards	CE In accordance with European Union directives	EN 61 000-6-1 / EN 61 000-6-3
	EMC Standard	2004/108/EC
	LVD Standard	2006/95/EC
	Product standards	
	Automatic electrical controls for household and similar use	EN 60 730 –1
	Special requirement on temperature dependent controls	EN 60 730 – 2 - 9
	Degree of Protection	IP30 to EN 60 529
	Safety Class	III (IEC 60536)
Housing	Materials	
	Front & Power Module	Fire proof ABS plastic (UL94 class V-0)
	LCD Cover Lens	PC
General	Dimensions(Width x Height x Depth)	
	Front Module	86mm (W) x 86mm (H) x 14mm (D)
	Power Module	49mm (W) x 62mm (H) x 25mm (D)
	Weight: Unit Only	124.2 g
	Overall Package	192.3 g

Wiring Diagrams:

RDV62

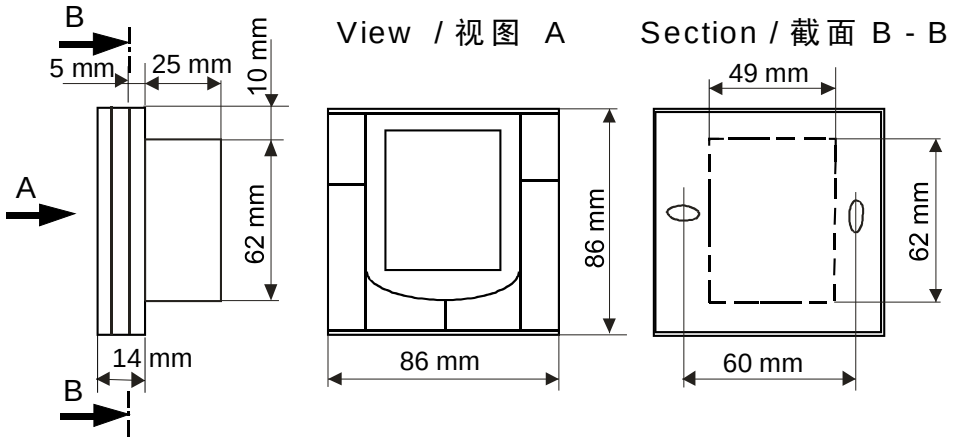


RDV69



Legend:	Y1, Y2	Actuators, Valves, etc.
	E1	Electrical Load 2-Position Control
	T1	NTC Sensor Input or Auto H/C Changeover Sensor Input
	X1	Auxiliary Input (0…5 V, 0…10 V or 0…20 mA)
	D1	Manual Switch (Open Contact to Ground)

Dimensions:


B
5 mm
25 mm
10 mm
A
62 mm
14 mm
B
View / 视图 A
86 mm
86 mm
Section / 截面 B - B
49 mm
62 mm
60 mm