

RD1xx Controller



Contents

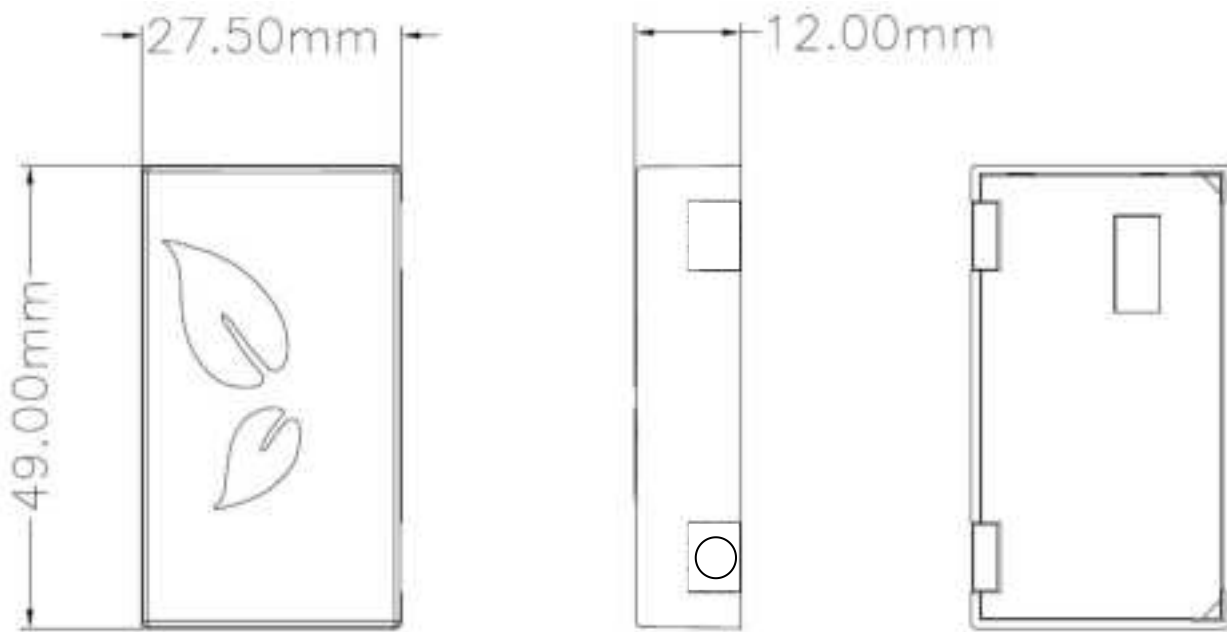
OVERVIEW	2
MODEL RD101: INFRARED SPLIT HVAC CONTROLLER	3
MODEL RD102: RF-BRIDGE	4
MODEL RD103: MITSUBISHI ELECTRIC VRF CONTROLLER	5
MODEL RD104: MASTER CONTACTOR	6
MODEL RD105: DIGITAL IN/OUT	7
SPECIFICATIONS	8
USER INTERFACE	8
SENSORS	8
RADIO	8
SOFTWARE	8
DEVICE	8
ENVIRONMENTAL AND PHYSICAL SPECIFICATION	8
ORDERING INFORMATION	8

Disclaimer: This document contains information that is the proprietary and confidential property of AuVerte. By acceptance hereof, each recipient agrees to use the information contained herein only for the purpose anticipated by AuVerte, and not to disclose to others, copy or reproduce, any part hereof without the written consent of AuVerte. The recipient agrees to return this document to AuVerte immediately upon request.

Overview

The RD1xx Controller from AuVerte is part of a modern room automation solution. The principal applications of the RD1xx are bridging the RF communication of a room automation system towards a distributed actuator and sensor installation. In cases where it is not feasible to wire a load or a sensor back to a load center, the RD1xx is ideally suited to perform a limited number of operations in close proximity to the controlled load.

To accommodate various application profiles, the RD1xx is available in several different models. While based on the same PCBA (printed circuit board assembly) design, the variants differ in the electronic components that are assembled on the PCBA and the software that operates the device.



Model RD101: Infrared Split HVAC Controller

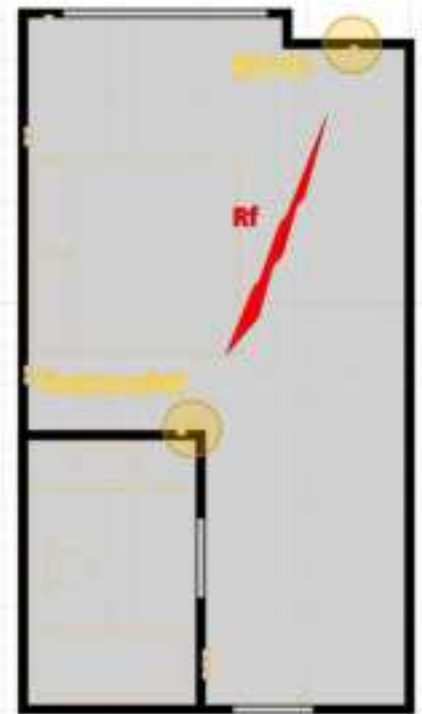
The RD101 is applicable in spaces where the HVAC unit is controlled with an IR code. This is commonly the case with lower end split or VRV/VRF HVAC systems.

The RD101 receives control commands from one of the AuVerte thermostat models and translates the desired control setting into an HVAC model compatible IR code. As the RD101 is typically placed near the IR receiver of the HVAC unit, this control is very robust, and the common limitations of a line-of-sight control do not apply.

The compact size of the RD101 allows it to be placed inside the HVAC housing. With the strength of the on-board IR transponder, reliable IR transmission can be achieved through the housing reflections.

In most instances, the HVAC unit can be used to source the power for the RD101 which makes the wiring extremely effective and simple.

AuVerte has a flexible IR driver technology which allows loading the room compatible IR driver during deployment and commissioning. This capability extends that each room can have a different HVAC model and the respective IR driver can be assigned on per-room basis.



The wiring of the RD101 is shown to the right. Connect pin 1 (brown) to GND and pin 2 (red) to 12VDC.



Model RD102: RF-Bridge

Many AuVerte controllers contain a built-in RF radio transceiver. This capability allows a device to directly participate in a distributed room automation system. Such a controller that features a built-in RF radio is for example the DIN-rail mountable DM102 relay controller. On occasion however, and most often required by electrical code, these controllers are mounted inside a sheet metal enclosure. In such circumstances, it might not be possible to establish a sufficiently robust RF link between the devices inside the sheet metal enclosure and the devices that are outside the enclosure. To overcome this limitation, one of the controllers inside the sheet metal enclosure connects with the RD102 (RF Bridge) device that will be placed outside the enclosure. In such an application, the RD102 will provide the full RF performance for all the devices inside the sheet metal enclosure as the different controllers mounted inside the enclosure are daisy-chained and share the RD102 link with the outside world.

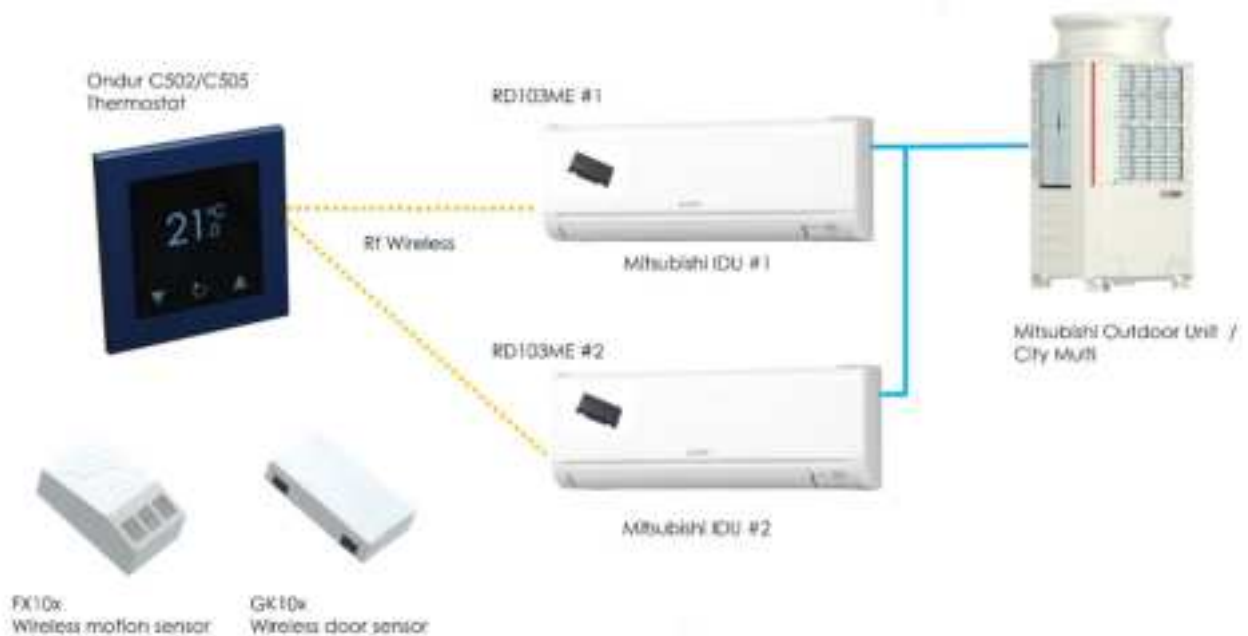


In the image above, we see the RD102 on the left side. It is connected with the four-wire harness to the DM102 controller on the left. This controller in turn daisy chains with the DM102 controller on the right. A single off-the-shelf power supply will provide the necessary power for all the devices.

Model RD103: Mitsubishi Electric VRF Controller

The RD103 is an embeddable controller that is mounted inside most VRF indoor units by Mitsubishi Electric. Sample indoor units are for example the Mr. Slim product line by Mitsubishi.

With an AuVerte provided dedicated harness, the RD103 connects directly to one of the headers of the Mitsubishi indoor units. As the housing of the indoor unit is made of plastic, the RD103 can be mounted inside the indoor unit enclosure and therefore is not visible from the outside. Communicating with RF, the RD103ME receives control signals from one of the different AuVerte thermostats.



In the image above we see a typical setup with a Mitsubishi VRF system. Normally, each space contains only a single indoor unit however the image shows that the solution can be scaled to many indoor units that are controlled from a single thermostat. Such a situation can arise in large spaces such as large hotel rooms and suites, function rooms such as gyms and offices, etc...

Model RD104: Master Contactor

The main application of the RD104 is to drive high-wattage master contactor application. For example, the room occupancy status can be routed to one or two relays that control the power to all the lights, outlets and fixed appliances, such as HVAC, TV or other electrical appliances.

The RD104 can drive one or two external relays. In many instances, the relay assembly that is operated by the RD104 is sourced locally by the system integrator. Figure 1 is an example of an off-the-shelf relay assembly that contains two 240VAC/30A power relays by Potter&Brumfield. These relays have each a 12VDC coil and can be directly operated from the RD104 controller. This assembly can be Din-rail mounted and if enclosed in a sheet metal box, the RD10x device would be outside this enclosure for proper working of the Rf link with the rest of the system.

Figure 2 shows a panel-mount relay. The RD10x device can directly operate the 12VDC relay coil. Such relays can be sourced locally by the system integrator. Again, as in the example above, if the relay is housed inside a sheet metal enclosure for safety reasons, the RD10x device should be placed outside to facilitate the proper working of the Rf links.

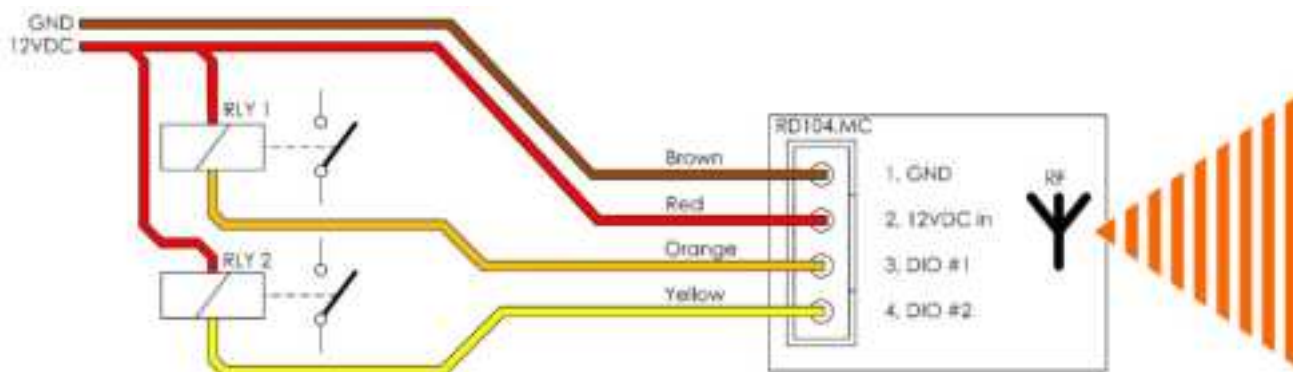
An additional possibility is that the RD10x can control a RIB (Relay in a box) device. As before, these devices are readily available and can be sourced by the system integrator.



Figure 1 Din-rail mounted dual-relay assembly compatible with RD104



Figure 2 Panel-mount relay T9AP1D52-12 by Potter&Brumfield



Model RD105: Digital In/Out

The RD105 is a general-purpose input/output controller. The pins can be configured at system design time to perform application specific functions. Some select examples of how the RD105 can be applied:

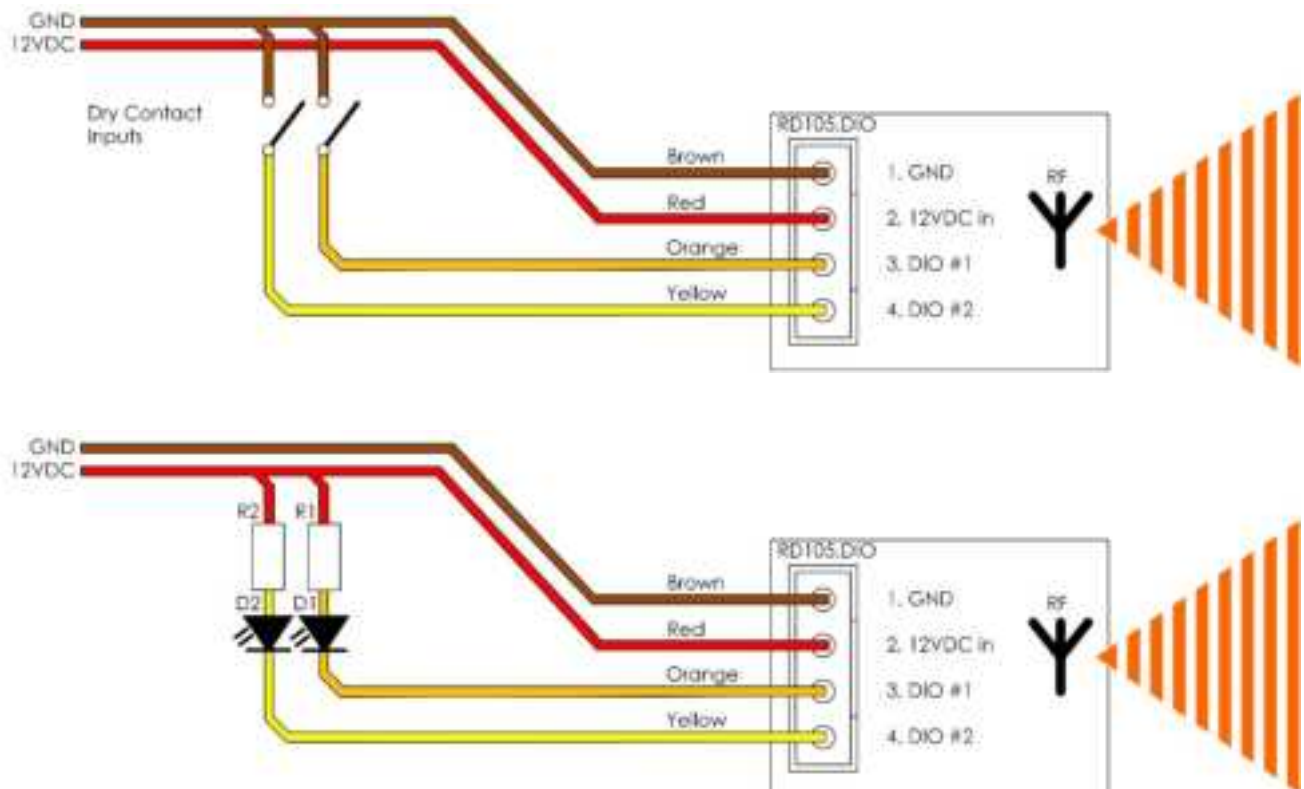
- Extend an Ondur thermostat to operate the open/close windings of a motorized proportional valve.
- Extend an Ondur thermostat and operate secondary or tertiary heating stages.
- Signal room occupancy as a dry-contact input to a third-party system.

Figure 3 shows an example if the RD105 is used to operate two general purpose relays. In this case, a relay of moderate contact rating is used and the contacts can be used to operate in the aforementioned applications.



Figure 3Din-rail mounted dual-relay assembly compatible with the RD105

Below, are example wiring diagrams is the RD105 is used in a low-voltage application.



Specifications

User Interface

The RD10X has no user interface.

Sensors

IR Transmitter	940nm wavelength, 50 degrees
IR Modulation	36-40 kHz
IR Encoding	PPM (Pulse Position Modulation) PDM (Pulse Duration Modulation) Bi-Phase Modulation
Digital inputs	Dry-contact sensing with a 5VDC signal pulled to GND. Drive current 2mA.
Digital outputs	Open collector NPN transistor, switching 12VDC with up to 100mA drive current. Built-in free-run diode for inductive loads

Radio

Standard	IEEE 802.15.4
Frequency band	ISM 2.4 GHz
Interference immunity	DSSS (Direct sequence spread spectrum)
Data rate	250 kbps
Antenna	Built-in
Indoor range	Up to 50 m (150 ft)
Transmit power	+3 dBm
Receiver sensitivity	-95 dBm
Channels	16 (11 to 26, default 25)
Protocol	AuVerte mesh, IPv6 over 802.15.4 with forward error correction (FEC-ECC)

Software

IPv4	Not supported
IPv6	ICMPv6, IP, UDP, CoAP
Encryption	AES128
Hashing	SHA256, AES-CMAC
Key Exchange	ECDH
Routing	UDP – AuVerte mesh IPv6 – IPv6 over 802.15.4
App Security	DTLS
Cyber security	Packet authentication, packet inspection, certificate-based access control, configurable encryption keys with no backdoors, JTAG disabled. Configurable port-based firewall

Device

Power	12VDC / 50mA
Mounting	Free hanging or surface mount with double-sided mounting tape
Colors	White or black

Environmental and Physical Specification

Dimensions	49mm x 27.5mm x 12mm
Weight	0.012 kg, 0.42oz
Operating temperature	10 °C to 40 °C (50 °F to 104 °F)
Storage temperature	-20 °C to 50 °C (-4 °F to 122 °F)
Operating humidity	10 % to 95 %RH, non-condensing
Storage humidity	5 % to 90 %RH, non-condensing
Environmental light	Keep installed device from direct or strong exposure to sun and illumination devices.
Electromagnetic emissions	FCC Part 15C EN 62311 (EMR) ETSI EN 300 328 (2.5GHz ISM Band) ETSI EN 301489 (EMC)
Safety approvals	EN62368-1
Environmental	RoHS
Cleaning	Mild cleaning liquid, soft towel
Recycling	6.5g ABS, 5.5g electronics

Ordering Information

Part numbers	003006.IR (RD101, IR split HVAC) 003006.RFB (RD102, RF-Bridge) 003006.ME (RD103, Mitsubishi VRF) 003006.MC (RD104, Master Contactor) 003006.DIO (RD105, I/O)
Package content	6 RD1xx controllers
Color Options	■ White ■ Black
Options	Harness

FCC Warning

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

AuVerte AG

Rothusmatt 14, CH-6300 Zug, Switzerland

RD1xx Controller

Model: RD101 Controller

Power: DC Input: 12VDC 50mA

FCC ID: 2AWOQ-RD101

FRN 0029680147



This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.



AuVerte AG
Rothusmatt 14
CH-6300 Zug
Switzerland
www.auverte.com