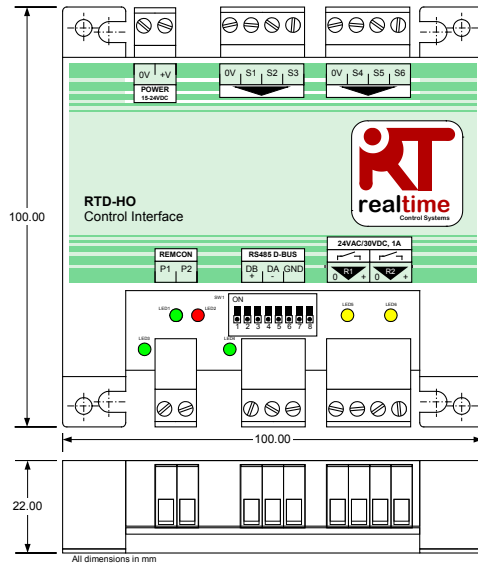
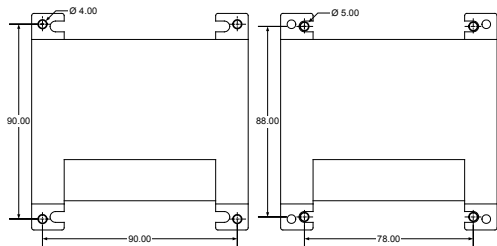


RTD-HO

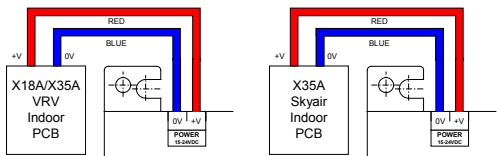
Installation Instructions

English RTD-HO Installation Instructions

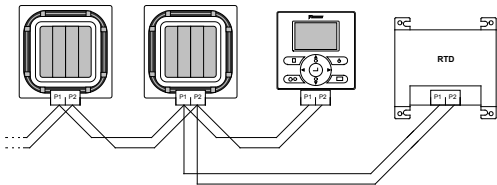




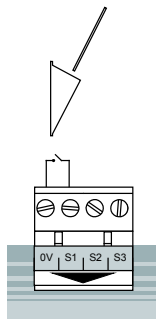
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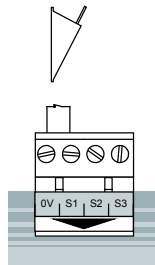
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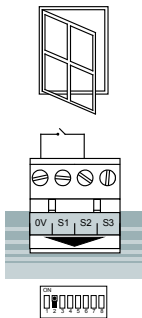
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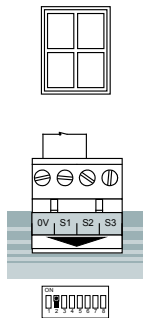
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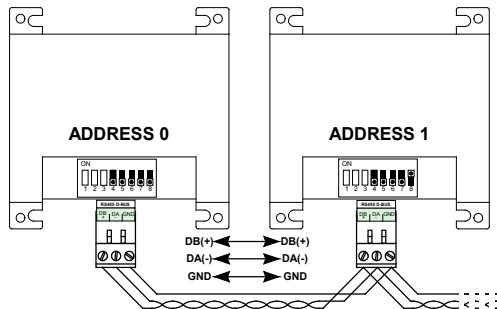
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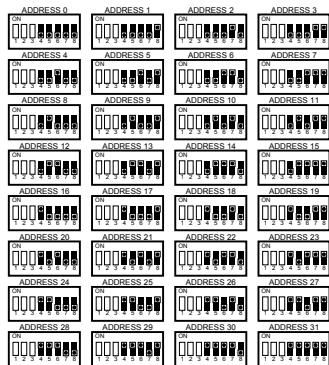
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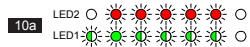
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8



9



Warnings and Cautions

Do not exceed the specified fault relay ratings (maximum 1A, 24VAC/30VDC). Relays not intended for connection to safety critical equipment.

All cable connections to the device must be adequately secured by suitable strain relief fasteners

The RTD must either be mounted in a suitable metal enclosure or plastic enclosure with a flammability rating of at least IEC60695-11-10 V-1. Do not install it inside the air-conditioning unit. In all cases access by non-qualified persons must be prevented (the enclosure may not be accessible without a tool). The unit can be mounted horizontally or vertically

When the RTD is powered from the indoor unit power supply or other non-SELV supply, all external wiring and electrically attached devices must be suitably insulated to prevent access by non-qualified persons. Where this is not possible, the RTD must be powered from an SELV supply.

RS485 Cables must use stranded 24awg shielded or unshielded twisted pair to Cat3, Cat4 or Cat5 specification. Use a twisted pair for connections DB,DA and an extra core for connection GND. Install RS485 cable as shown in Figure 4.

The P1,P2 Network should be connected as shown in Figure 3. Up to 16 units and one remote controller can be connected to the RTD.

S1 to S6 cables should be 0.5 to 1.0 mm² multi-stranded screened twisted pair. The screen should be earthed at one end only. The maximum distance from the RTD to the input source is 200m.

Specifications

Electrical

Supply	15V-24V DC, 120mA Regulated
Power	<2.5VA
Relay	1A, 24VAC max 1A, 30VDC max
Connectors	Rising clamp to 0.75mm ² cable

Network

P1P2	<500m
RS485	<500m

Environmental

Temperature

Storage	-10oC to 50oC
Operation	0oC to 50oC
Humidity	0-90% RH non-condensing

Inputs

Resistance Mode	S1..S6 5V, 1mA
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Your product is marked with the symbol shown to the left. This symbol on the product indicates that this product must not be disposed of with your other household waste. Inappropriate disposal may be harmful. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. Units must be treated at a specialized treatment facility for re-use, recycling and recovery. By ensuring this product is disposed of correctly, you will help to prevent potential negative consequences for the environment and human health. Please contact the installer or local authority for more information.



Observe precautions for handling Electrostatic Sensitive Devices

Additional information, including Modbus configuration and Fault Codes are available from www.realtime-controls.co.uk/rtd

RTD-HO Installation Instructions

The RTD-HO is a control interface for Daikin VRV and Skyair ranges of air-conditioners. The interface is compatible with all units that have a P1,P2 remote controller network connection and allows control of up to 16 units in a single group.

The RTD-HO is designed to manage hotel rooms where a volt-free contact is used to indicate room occupancy status. When the room is occupied the occupant is allowed full access to the A/C operation through a wired remote controller, with setpoints limited to the range 19 to 24 or 29 in High Temperature Mode.

When the room is unoccupied the RTD will initially operate the room to maintain minimum comfort conditions for the occupant. After 18 hours the RTD reverts to the Unoccupied state and only operates the A/C to protect the room from extreme temperatures.

The RTD also supports a window switch input to prevent unit operation when the room window is opened.

Installation

MOUNTING (FIGURE 1)

The RTD-HO is supplied with 4 mounting pillars that can be used to mount the interface within units with compatible mounting holes. The RTD-HO can also be mounted using screws of up to 5mm diameter.

POWER SUPPLY (FIGURE 2)

The RTD requires a 15V to 24VDC power connection. Power can be supplied from VRV indoor unit PCB X18A or X35A connection, a Skyair indoor unit PCB X35A connection or VAM PCB X11A connection. A 1m cable and connector is supplied with the RTD.

P1,P2 NETWORK (FIGURE 3)




Terminals P1, P2 connect to the Daikin P1, P2 network. P1,P2 installation should follow Daikin installation specifications. The RTD-HO can operate in Master or Slave mode with any Daikin remote controller. Operation is also possible without a remote controller being connected. Note that BRC infra-red receivers must be configured to operate in SUB (S) mode (RTD in MAIN (M) mode).

LED FUNCTIONALITY (Figures 10 to 12)

When the RTD-HO is powered up, or if it loses communication with the Remote Controller the RTD-HO enters P1,P2 search mode. If P1,P2 communications are not re-established after 1 minute the RTD-HO will raise an alarm which will be indicated on the fault relay output. Led behaviour is shown in the following figures

Power-Up sequence: Factory Configuration	Figure 10a
Power-Up sequence: Custom Configuration	Figure 10b
P1,P2 Search. After power-up and during unit configuration	Figure 10c
No Fault State	Figure 11a
Unit Fault	Figure 11b
Device configuration error	Figure 12a
AC Unit Missing (U5 Fault)	Figure 12b
RS485 Communications timeout	Figure 12c

LED Key:

 OFF	 ON	 Flashing
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Inputs

Input	Name	State
S1	Room Occupied	Open Circuit: Room Unoccupied Closed Circuit: Room Occupied
S2	Window Open	Open Circuit: Window Open (enable using DIP SW2=ON) Closed Circuit: Window Closed
S4	Window Standby Option	Open Circuit: Unit Off when Window Open Closed Circuit: Force Thermo Off when Window Open

It is recommended that volt-free contacts or switch mechanisms have gold plated contacts to ensure a low resistance circuit when the switch is made.

S1 to S2 cables should be 0.5 to 1.0 mm² multi-stranded twisted pair.. The maximum distance from the RTD to the input source is 200m.

Outputs

Output	Name	Operation
R1	Run	Closed when unit switched ON
R2	Fault	Closed on any unit fault

Caution: Relays rated for maximum 1A, 24VAC/30VDC

Control Operation: Setback Enabled



RTD-HO determines if the room is OCCUPIED, VACATED, UNOCCUPIED, UNBOOKED based on the state of input S1. (Figures 4 and 5).

OCCUPIED, S1 = Closed Circuit

The A/C can be operated from the wired Remote Controller, the setpoint range is limited to a the range 19 to 24°C. Unit Mode is restricted to FAN or AUTO*.

VACATED S1 = Open Circuit, period of 10 minutes after OCCUPIED

The A/C continues to operate for 10 minutes after the room is vacated, after which the RTD-HO switches to UNOCCUPIED.

UNOCCUPIED, S1 = Open Circuit, period of 18 hours after VACATED

The A/C switches off and the wired remote controller is locked. If the room temperature is less than 18°C or greater than 27°C the A/C will operate until the temperature falls within this band. The RTD retains the Setpoint, Fanspeed and operating Mode of the unit when OCCUPIED, if the room becomes OCCUPIED during this period the user settings will be restored.

UNBOOKED, S1 = Open Circuit, period after 18 hours of UNOCCUPIED

The systems reverts to the UNBOOKED state, the default OCCUPIED settings are reset to Setpoint = 22, Fan = Low, Mode = AUTO*. If the room temperature is less than 17°C or greater than 28°C the A/C will

* Units that do not support Auto such as heat-pump slave units will show HEAT or COOL Depending on current heat/cool availability.

operate until the temperature falls within this band.

Control Operation: No Setback



RTD-HO determines if the room is OCCUPIED, VACATED, UNBOOKED based on the state of input S1 (Figures 4 and 5).

OCCUPIED, S1 = Closed Circuit

The A/C can be operated from the wired Remote Controller, the setpoint range is limited to a the range 19 to 24°C.

VACATED S1 = Open Circuit, period of 10 minutes after OCCUPIED

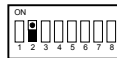
The A/C continues to operate for 10 minutes after the room is vacated, after which the RTD-HO switches to UNBOOKED.

UNBOOKED, S1 = Open Circuit, period after VACATED

The systems reverts to the UNBOOKED state, the default OCCUPIED settings are reset to Setpoint = 22, Fan = Low, Mode = AUTO*. If the room temperature is less than 17°C or greater than 28°C the A/C will operate until the temperature falls within this band.

Window Switch Operation

If SW2 is ON then input S2 should be wired to a window switch. If the window is open the unit operation is inhibited (Figures 6 and 7).



Window Closed, S2 = Closed Circuit

The A/C can be operated normally depending on the current occupancy

state of the room.

Window Open, S2 = Open Circuit

If the room is OCCUPIED and input S4 is open circuit then the unit will switch off and operation from the remote controller is prohibited.

If the room is OCCUPIED and input S4 is closed circuit then the unit will continue to run, but a Force Thermo Off command will be sent to the unit to prevent heating or cooling from occurring.

If the room is not OCCUPIED then the unit will remain off under all conditions

Standard Temperature Mode



If SW3 is OFF then the RTD-HO operates in StandardTemperature mode with the following values

	Minimum	Maximum
BRC Setpoint	19°C	24°C
UNOCCUPIED Limit	18°C	27°C
UNBOOKED Limit	17°C	28°C

In Standard Temperature mode the remote controller temperature reset value is 22°C.

High Temperature Mode

If SW3 is ON then the RTD-HO operates in High Temperature mode with the following values



	Minimum	Maximum
BRC Setpoint[†]	19°C	29°C
Heating Range	19°C	24°C
Cooling Range	24°C	29°C
UNOCCUPIED Limit	18°C	31°C
UNBOOKED Limit	17°C	33°C

[†]BRC Setpoint can be adjusted across the range 19°C to 29°C. Heating and Cooling operation are limited to the ranges specified in the table.

In High Temperature mode the remote controller temperature reset value is 26°C.

Temperature Control

In the UNOCCUPIED and UNBOOKED modes the RTD monitors the room temperature and runs the unit if the temperature is outside of the specified limits. Therefore for correct operation the sensor used for temperature control must be located within the room.

If the wired remote controller is configured as MAIN and there is only one indoor unit then the unit should be configured to use the remote control temperature for temperature control. Otherwise the unit return air temperature will be used, in which case the sensor MUST be positioned within the room.

Heat-Pump Operation

In the case of heat-pump installations, the AUTO mode must not be enabled. Two configurations are possible:

1. A manual heat/cool changeover switch (KRC19-26) is connected to the outdoor unit (A-B-C terminals) and all indoor units operate as heat/cool slaves.
2. An ITouch/Central Controller remote controller mode button prohibit is written to the heat/cool master and the heat/cool master mode is set to heat or cool by the Centralised device.

In heat-pump operation, unit operating modes are restricted to the available heat/cool mode. High and low temperature protection operations are only available if the corresponding mode is currently available.

Modbus Operation

The RTD-HO supports Modbus Readback functions via the RS485 network.

MODBUS CONFIGURATION

Network	3 wire RS485
Mode	Modbus RTU Slave
Baud	9600*
Parity	None*
Stop bits	1
Register Base	0

*RTD interfaces can be configured with different baud rate and parity settings if required

RS485 network installation is illustrated in Figure 8. The Modbus address range 0 to 31 is set using SW1 (Figure 9).

Further details of Modbus register functionality and fault and temperature formatting can be found in the *RTD-NET Installation Instructions* available at www.realtime-controls.co.uk/rtd.

All readback data is available in analogue Input Registers.

REMOTE CONTROLLER READBACK

In a standard installation the Remote Controller temperature sensor value **I0050** is available **only if there is only one indoor unit on the P1,P2 network and the Remote Controller is configured as MAIN.**

The RC Operation Mode **I0051** returns the current operating mode of the group.

Input Register	Name	Range
I0050	RC Temperature	Degrees C x 100 (only available for 1 indoor unit)
I0051	RC Operation Mode	0:Idle/Fan, 1:Heating, 2:Cooling, 3:Heat and Cool

GROUP READBACK

Group data registers provide a summary of the data from all active indoor units on the network.

Input Register	Name	Range	Notes
I0020	Unit Count	0..16	Number of units found on network
I0021	Is Fault	0..1	0:No Fault, 1: At least one unit in fault
I0022	Fault Code	0..65535	255: No Fault, else fault code from first unit in fault
I0023	Return Air Average	Degrees C x 100	Average of all unit return air temperatures
I0024	Filter Alarm	0..1	0: No Alarm, 1: At least one unit with filter alarm
I0030	Thermo On	0..3	Summary of unit operation 0:Idle/Fan, 1:Heating, 2:Cooling, 3:Heat and Cool
I0035	Defrost	0..1	0: No defrost, 1: At least one unit in defrost Indicates unit in Pressure Equalisation, Hot Start/Pre-heat or outdoor unit Defrost condition