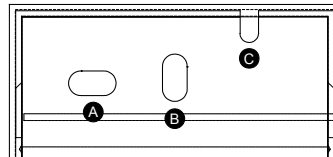
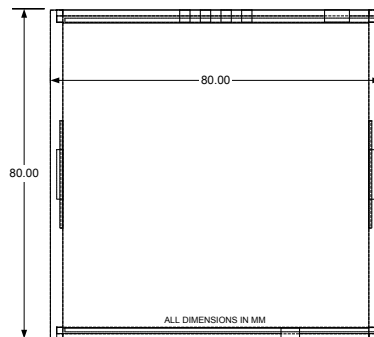
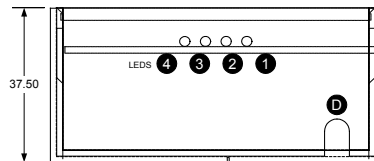
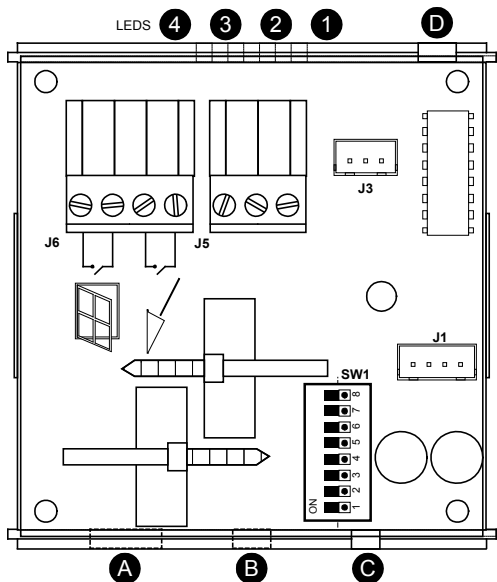


# UK.RTD-LCHO

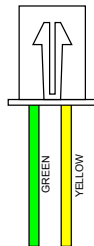
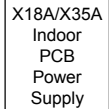
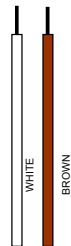
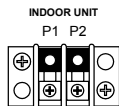
## Installation Instructions

English Installation Instructions

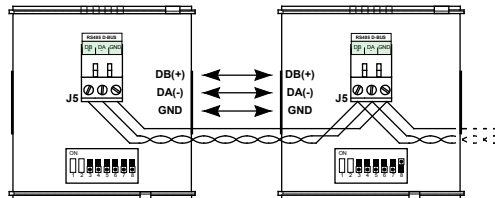




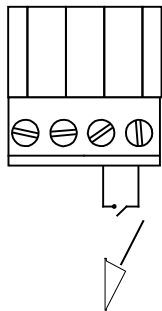
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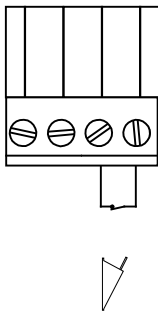
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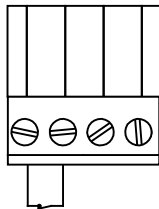
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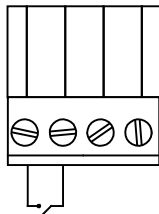
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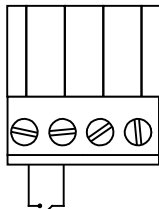
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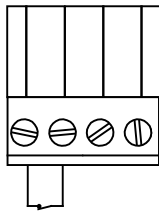
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SW1



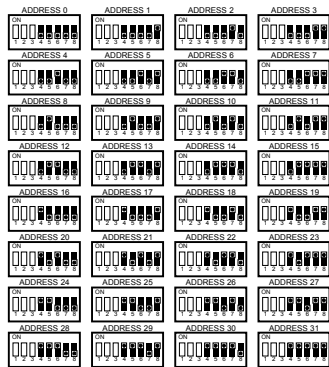
7



9



SW1



**10**



## Warnings and Cautions

All cable connections to the device must be adequately secured by suitable strain relief fasteners. Cables supplied with strain relief bands must be fitted in the corresponding cable guide slot with the strain relief band inside of the enclosure.

Do not install the RTD inside the air-conditioning unit. Ensure that all external wiring and electrically attached devices is suitably insulated to prevent access by non-qualified persons.

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 to J5 terminals as shown in Figure 3.

Cable connections to J6 inputs should be 0.5 to 0.75 mm<sup>2</sup> 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

<b>Supply</b>	15V DC, 50mA Regulated
<b>Power</b>	<1.0VA

<b>Connectors</b>	Rising clamp to 0.75mm <sup>2</sup> cable
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### Network

<b>RS485</b>	<500m
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### Environmental

#### Temperature

<b>Storage</b>	-10oC to 50oC
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<b>Operation</b>	0oC to 50oC
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<b>Humidity</b>	0-90% RH non-condensing
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### Inputs

<b>Volt-Free Contact</b>	S1..S2 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](http://www.realtime-controls.co.uk/rtd)

## RTD-LCHO Installation Instructions

The RTD-LCHO 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 a single indoor unit on the P1,P2 network.

The RTD-LCHO 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.

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. An optional PIR Motion Sensor allows operation setback during periods of no detected activity.

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

### MOUNTING

The RTD-LCHO is supplied with an adhesive pad fixed to the rear of the enclosure. The RTD-LCHO can be mounted in any orientation to a suitable flat surface by removing the protective wax paper on the adhesive pad. Ensure that the mounting surface is smooth, dry and free from contamination.

### AC UNIT CONNECTION (Figure 2)

The RTD-LCHO is supplied with a pre-fitted lead for power and communication with the air-conditioning unit. The lead allows a maximum distance of 1250mm from the RTD-LCHO to the connection point in the indoor unit. The lead should be fitted and secured through

suitable access points in the air-conditioner. The pre-stripped wires should be fitted to the the P1,P2 screw terminals and the 2-way connector should be inserted into the X18A or X35A power supply connection on the indoor PCB as illustrated in Figure 2.

The AC Unit lead enters the RTD-LCHO through Port D on the enclosure as shown in Figure 1, the lead is supplied pre-fitted to J1 on the RTD-LCHO PCB. The fitted strain relief band on the cable must be located on the inside of the enclosure.

### RS485 NETWORK INSTALLATION (FIGURE 3)

The RS485 D-Bus network requires a twisted pair cable connecting terminals DB(+) and DA(-) on each RTD-LCHO. Terminal DB must be connected to all other DB terminals. Terminal DA must be connected to all other DA terminals. In addition the common terminal GND on all devices must be connected together. If a shielded cable is used then the shield can be used for this purpose. It is recommended that the GND connection is connected to local Earth at one point only. The network must be installed as a daisy-chained point-to-point Bus configuration, Star and Ring connections must NOT be used.

The RS485 Network lead should be connected to terminals J5 on the RTD-LCHO PCB and should be fitted through Port B on the enclosure as shown in Figure 1. The PCB mounted strain-relief must be used to secure the network cable. Cables should have a maximum outside diameter of 5mm.

## LED FUNCTIONALITY

When the RTD-LCHO is powered up, or if it loses communication with the Remote Controller the RTD-LCHO enters P1,P2 search mode. If P1,P2 communications are not re-established after 1 minute the RTD-LCHO 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 11a
Power-Up sequence: Custom Configuration	Figure 11b
P1,P2 Search. After power-up and during unit configuration	Figure 11c
No Fault State	Figure 12a
Unit Fault	Figure 12b
Device configuration error	Figure 13a
AC Unit Missing (U5 Fault)	Figure 13b
RS485 Communications timeout	Figure 13c
Commissioning Mode	Figure 13d

LED Key:

 OFF	 ON	 Flashing
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## Inputs

Input	Name	State
S1	Window Open	Window Open State determined by SW2
S2	Room Occupied	Open Circuit: Room Unoccupied Closed Circuit: Room Occupied

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 mm<sup>2</sup> multi-stranded twisted pair.. The maximum distance from the RTD to the input source is 200m.

## PIR INPUT

A Daikin supplied Passive Infra-red Sensor (RTD-PIR/7.5M) can be fitted to input J3, the cable should be fitted through Port C on the enclosure as shown in Figure 1. The fitted strain relief band on the cable must be located on the inside of the enclosure. Please refer to Installation Manual of Daikin RTD-PIR/7.5M for further information.

## Control Operation: Setback Enabled



If SW1 is OFF the RTD-LCHO determines if the room is OCCUPIED, VACATED, UNOCCUPIED, UNBOOKED based on the state of input S2. (Figures 4 and 5).

## OCCUPIED, S2 = 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 S2 = Open Circuit, after a period of 10 minutes when exiting OCCUPIED**

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

**UNOCCUPIED, S2 = Open Circuit, for a period of up to 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

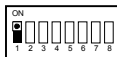
operate until the temperature falls within this band. The RTD retains the Setpoint, Fanspeed and operating Mode of the unit when OCCUPIED, if the room becomes OCCUPIED during this period the user settings will be restored.

### **UNBOOKED, S2 = 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 operate until the temperature falls within this band.

### **Control Operation: No Setback**

If SW1 is ON the RTD-LCHO determines if the room is OCCUPIED, VACATED, UNBOOKED based on the state of input S2 (Figures 4 and 5).



### **OCCUPIED, S2 = 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 S2 = 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-LCHO switches to UNBOOKED.

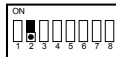
### **UNBOOKED, S2 = Open Circuit, period after VACATED**

The systems reverts to the UNBOOKED state, the default OCCUPIED settings are reset to Setpoint = 22, Fan = Low, Mode = AUTO\*. If the

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

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 (Normally Open)**



If SW2 is OFF then input S1 supports a Window Switch that is Normally Open when the window is closed (Figures 6 and 7). If the window is open the unit operation is inhibited according to SW3 position.

### **Window Closed, S1 = Open Circuit**

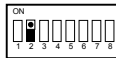
The A/C can be operated normally depending on the current occupancy state of the room.

### **Window Open, S1 = Closed Circuit**

If the room is OCCUPIED then unit operation is prohibited

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

### **Window Switch (Normally Closed)**



If SW2 is ON then input S1 supports a Window Switch that is Normally Closed when the window is closed (Figures 8 and 9). If the window is open the unit operation is inhibited according to SW3 position.

### **Window Closed, S1 = Closed Circuit**

The A/C can be operated normally depending on the current occupancy state of the room.

## Window Open, S1 = Open Circuit

If the room is OCCUPIED then unit operation is prohibited.

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

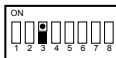
## Window Switch Mode : Unit Off

If SW3 is OFF then if the Window input S1 indicates **Window Open** then the unit will be locked OFF until input S1 indicates **Window Closed**.



## Window Switch Mode : Thermo Off

If SW3 is ON then if the Window input S1 indicates **Window Open** then the unit operation will remain unchanged but a Force Thermo Off signal is sent to the AC Unit to prevent active operation until input S1 indicates **Window Closed**.



## Standard Temperature Mode

The RTD-LCHO operates in Standard Temperature 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.

## 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. If the wired remote controller is configured as SUB then a Daikin remote sensor option KRCS01 must be used.

## Heat-Pump Operation

In the case of VRV Heat-Pump installations, an Indoor MUST NOT be set as the Heat/Cool Master and Outdoor field setting AUTO mode must not be enabled. Two configurations are possible for Heat/Cool Changeover

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.

## PIR Setback Operation

If the Optional PIR (RTD-PIR/7.5M) is connected to J3 then Setback Operation will be activated. During occupied conditions where the Input S2 is closed circuit, after a period of 15 minutes without PIR activity, a sliding setback mode will be activated. Over a period of 2 hours the control deadband will be incrementally widened to maximum of +/-3°C around the control setpoint. If at any point user activity is detected then the control will revert to occupied setpoint control.

## Commissioning Mode

When the RTD-LCHO is first powered the device will operate in commissioning mode for 15 minutes, as indicated by LED1 and LED2 (Figure 13d). During commissioning mode all timers are reduced to a period of 1 minute to allow for testing and demonstration of unit functionality

## Modbus Operation

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

### MODBUS CONFIGURATION

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

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

RS485 network installation is illustrated in Figure 3. The Modbus address range 0 to 31 is set using SW1 (Figure 10).

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](http://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

## UNIT READBACK

Input registers provide a summary of the data from the indoor unit.

Input Register	Name	Range	Notes
I0021	Is Fault	0..1	0:No Fault, 1: unit in fault
I0022	Fault Code	0..65535	255: No Fault, else unit fault code
I0023	Return Air Temperature	Degrees C x 100	Unit return air temperature
I0024	Filter Alarm	0..1	0: No Alarm, 1: unit filter alarm
I0030	Thermo On	0..3	Summary of unit operation 0:Idle/Fan, 1:Heating, 2:Cooling,
I0035	Defrost	0..1	0: No defrost, 1: Unit in defrost Indicates unit in Pressure Equalisation, Hot Start/Pre-heat or outdoor unit Defrost condition

## CONTROL OVERRIDE

Control Override Holding Registers allow control over unit operation.

Holding Register	Name	Range	Notes
H8001	Window Switch	0..1	S1 Override 0: Open Circuit, 1: Closed Circuit
H8002	Key Card	0..1	S2 Override 0: Open Circuit, 1: Closed Circuit
H8009	Unbooked Override	0..1	0: Standard Operation 1: Force UNBOOKED state

## STATUS READBACK

Status Holding Registers return additional application specific information. These registers are READ-ONLY.

Holding Register	Name	Range	Notes
H8503	Keycard Inserted	0..100	0: Keycard Removed >0: Keycard Inserted
H8504	Window Open	0..100	0: Window Closed >0: Window Open
H8506	Booked	0..100	0: Room Unbooked >0: Room Booked
H8507	Booked AND Occupied	0..100	0: Room Booked AND Unoccupied >0: Room Booked AND Occupied
H8510	Low Temperature Alarm	0..100	0: No Alarm >0: Low Temperature Alarm
H8511	High Temperature Alarm	0..100	0: No Alarm >0: High Temperature Alarm

