RS-WMB, RD-WMB
Wallbus Room Sensors and Displays

RS-WMB, RD-WMB

Description

The RS-WMB and RD-WMB series of room sensors and displays are designed for mounting on a standard electrical back box, or wall mounting. They include a temperature sensor with an option for humidity sensing.

The RD-WMB also has a monochrome backlit LCD display with setpoint, override, and fan speed control.

They are designed to operate with Trend IQeco controllers.

Note: RD-IQ and RD-IQL are covered by separate data sheets.

Features

- Single power/signal connection to controller reduces wiring
- Temperature sensing plus humidity option
- Operates in either °C or °F
- Temperature and humidity versions also output dew point

- **RD only**
- Backlit LCD display with fan speed, occupancy, temperature, humidity, and setpoint displays
- Setpoint, fan speed, and occupancy override controls.
- Display of CO_2, and Outside Air Temperature values from controller

Physical

The adjacent diagram shows the RD-WMB. The RS-WMB has the same external dimensions, but does not have the display and buttons.

84 mm (3-5/16")

117 mm (4-5/8")

22 °C

24 mm (15/16")
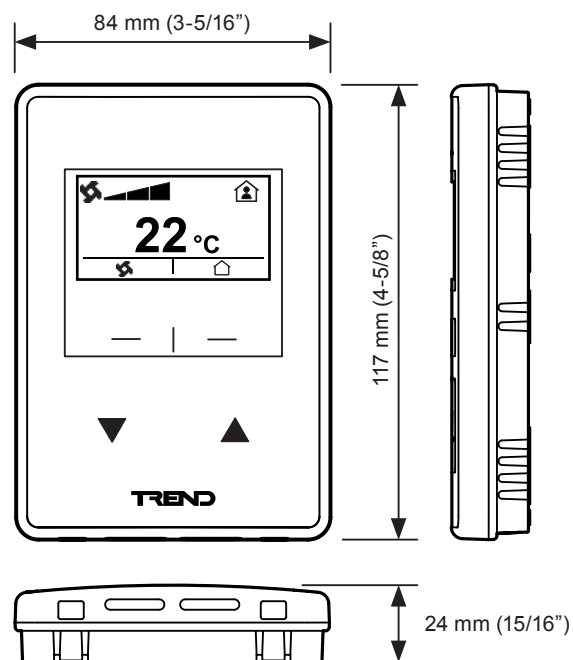
FUNCTIONALITY

An RS-WMB (Room Sensor) or RD-WMB (Room Display) connects to a controller (IQeco) via its wall mounting bus (WMB) connector. This two wire connection carries both signal and power for the unit. The values from the controller that the RD-WMB can display and change are fixed, but will only be enabled if set up in the controller.

Both RS and RD include a temperature sensor and will output the temperature in either °C or °F. There is an option to include a humidity sensor.

The RD-WMB enables the setpoint to be displayed and adjusted locally. It also provides for the display and adjustment of fan speed and occupancy. The fan button can also be configured to perform adjustment without displaying the fan speed icons (e.g. for controlling other equipment such as window blinds).

HARDWARE

Unit: The unit consists of a plastic back plate with a plastic clip-on main module. The back plate has several mounting holes enabling it to be used with a standard UK electrical back box, a standard US or Danish utility conduit box, or 60 mm wall outlet box. It can be mounted directly on a wall or on a front panel. Space must be left around the unit for airflow and access to remove the main module.
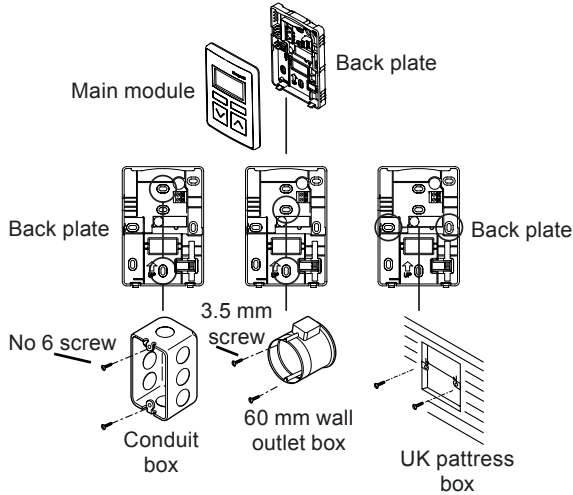
Versions: There are two main units, the RS-WMB and the RD-WMB

RD-WMB   RS-WMB
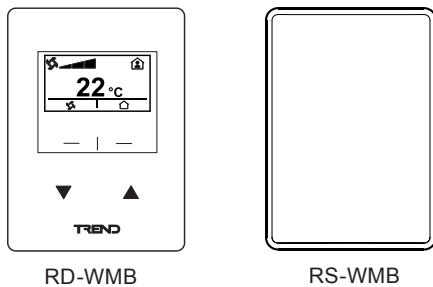
Both units are available with temperature sensor only or temperature plus humidity and/or CO_2 sensors.

The RD-WMB also has an LED display and 4 control buttons.

Input Power Supply: The power for the unit is supplied from the controller by way of the WMB wallbus.

Backup: The Settings Menu settings are stored in EEROM which is non-volatile to power interruptions.

Display: The RD-WMB's backlit LCD matrix display normally displays space temperature but can also display the humidity, CO_2, and temperature setpoint. There are icons to display fan, fan speed, and occupation status:

Display	Description
Displayed Value Type	
↕↗ (°C/°F)	Change setpoint
(°C/°F)	Inside temperature
⬦ (%RH)	Humidity
CO₂ (ppm)	CO_2 concentration
⌂↓ (°C/°F)	Outside temperature
Commands	
⇥	'Exit' to previous screen button
✎	Edit button
Occupation	
⬀⌂ (Unoccupied) ⌂ (Occupied)	Indicate the occupation state.
⌂	Button to override occupation (while in automatic control).
⬛	Button to clear occupation override (while overridden)
Fan	
✿	Indicates multi-speed fan being controlled. Indicates single speed fan ON Button to override fan / clear fan override.
AUTO	Indicates fan is in automatic speed.
OFF	Indicate manual fan speeds.
▰▱▱ (Low)	
▰▰▱ (Medium)	
▰▰▰ (High)	

**Buttons:** The RD-WMB front panel has four user buttons.
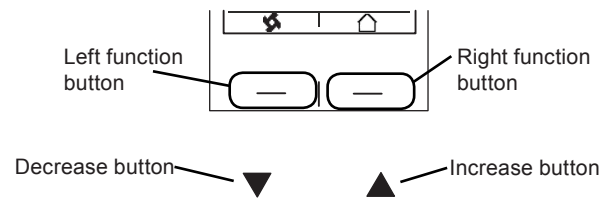
The two function buttons adopt the function shown in the display above them, so in the above diagram the left button will select manual fan control, and the right button, manual occupation override.

The decrease and increase buttons are generally used to set values (e.g. setpoint)

Pressing the decrease and increase buttons simultaneously will cause the unit to enter the 'More' Display Mode.

Pressing the two function buttons simultaneously and holding down for 5 seconds will cause the unit to enter Settings Menu.

Communication: The RS/RD-WMB connects to the IQeco controller's WMB port using two polarity independent wires. See installation instructions (TG201349) for details.
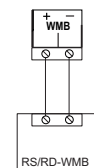
Address switch: The RS/RD-WMB has a DIL address switch. The unit is supplied with the switch in the default position, and should not be changed.

Note: Changing the address switch setting may stop communications.

FIRMWARE

The firmware in the RS/RD-WMB controls its basic functionality (e.g. what is displayed, the results of pressing the buttons)

Normal Operation

Startup Reset: The RS/RD will perform a reset cycle when power is applied. The RD-WMB will first display a Trend page followed by a page showing the unit firmware version and WMB bus address.

If communications with the controller are unsuccessful for 3 to 6 minutes the RD-WMB screen will display 'ERR' (error).

Illumination state (RD-WMB only)**:** By default the display's backlight will be off. Pressing any button will turn on the backlight. About 1 minute after the last button is pressed the backlight will turn off.

Value Displayed: By default the RD-WMB display will show local temperature but the unit can also show Temperature Setpoint, Humidity, CO_2 concentration, and Outside Air Temperature according to which options have been set up in the RD's Settings Menu, and what is available in the controller.

Use of Buttons

Occupation override: By pressing the ⌂ button the user will override the occupation state. If the current state is occupied it will override it to non-occupied, and display the unoccupied icon; the button will change to ▣ to indicate the state is overridden. Pressing the ▣ button will return the occupied icon to the display, and change the button back to ⌂. If the current state is unoccupied then the opposite sequence will occur (press ⌂ button, display occupied icon with button ▣; press ▣ button, display unoccupied icon with button ⌂).

Fan: Pressing the ✿ button will allow the user to override the fan speed control. Normally the fan will be under automatic control, and pressing the fan button will switch it into manual control. The way the fan operates is dependent on the type of fan control (see Fan Configuration below). For a 2 speed fan the absence of the fan icon indicates the fan is off, and the ✿ indicates the fan is on. For a multi-speed fan, the first press switches the fan off, and subsequent presses step through the available fan speeds (e.g. low, medium, high), and the next press sets it back to automatic control. The fan off condition can be shown by ✿ OFF. The low, medium, high, manual speeds, and automatic control state are shown by the fan ✿ icon in conjunction with ◂▱, ◂▰▱, ◂▰▰, **AUTO** respectively.

'More' Display Mode: Pressing the decrease and increase buttons simultaneously will cause the unit to enter the 'More' Display Mode. The choice of items to be shown in the 'More' Display Mode can be selected in the Settings Menu. If all items are selected, pressing either decrease or increase will step through the following in the appropriate direction.

Icon	Read/ Write	Units	Description
🌡✎	editable	°C or °F	Change temperature setpoint using decrease/increase buttons.
🌡	read only	°C or °F	Displays temperature
💧	read only	%RH	Displays humidity
CO_2	read only	ppm	Displays CO_2 concentration
⌂🌡	read only	°C or °F	Displays outside air temperature from controller

Where the item is editable, one of the function keys is labelled ✎ (edit). Selecting ✎ enables the value to be changed using the decrease/increase keys. One of the function keys is now labelled ✓ so that when the editing is finished selecting ✓ will accept the new value and return to More display mode.

Settings Menu: Pressing the two function buttons simultaneously and holding down for 5 seconds will cause the unit to enter the Settings Menu. This enables changes to be made to the way the RS/RD-WMB operates. First a PIN is requested:

ENTER PIN - Enter the 4 digit PIN using the decrease/increase buttons.

If successful the following functions can be stepped through in the appropriate direction using the decrease/increase buttons.

WMB ADDRESS: This is the address of the RS/RD-WMB on the WMB (set to 2 by default).

SETPOINT TYPE (editable): This enables the temperature setpoint to be displayed either as a number or as a graphical representation.

NUMERICAL
GRAPHICAL ▁┈┈┈┈┊┈┈┈┈┊

HOME SCREEN (editable): This selects what is displayed on the home screen.

Home Display	Description
OUTSIDE TEMP	The home screen will display outside air temperature.
TEMP SETPOINT	The home screen will display temperature setpoint.
TEMPERATURE	The home screen will display temperature.
HUMIDITY	The home screen will display humidity.
CO_2	The home screen will display CO_2 concentration.
BLANK SCREEN	The home screen will display a blank screen.
S C R O L L I N G SCREEN	The home screen will scroll through the available values Temperature, Temperature setpoint, Humidity (if option available), CO_2 concentration (if option available), Outside Air Temperature (if available in controller).

FIRMWARE REV (read only): The firmware revision number.

Editable items can be changed in the same way as items in the 'More' display as described above.

Fan Configuration (RD-WMB only)

The fan can be operated in one of 7 modes; modes 0 to 6.

On power up of the RD the fan configuration mode is set by the controller according to the 'Fan Configuration' parameter (f) of I/O module 2 (f=0 to 6 as listed below).

Mode	Description
0	No fan on home screen. The fan icon (🌀) is not shown. The Fan function button is not shown on the Home display.
1	2 position fan (Off/On). The fan icon (🌀) indicates the fan is on, its absence indicates the fan is off. The Fan function button sends values 0=OFF, 255=ON.
2	3 position fan (Off, On, Auto). The fan icon (🌀) indicates the fan is on, its absence indicates the fan is off, the fan icon 🌀 and AUTO indicates the fan is in auto mode. The Fan function button sends values 0=OFF, 1=ON, 4=AUTO
3	4 position fan (Off, 1, 2, 3). The Fan function button sends values 0=OFF, 1=Low, 2=Medium, 3=High. See appropriate rows in table in mode 4 below:
4	5 position fan (Off, 1, 2, 3, Auto). Fan function button sends values 0=OFF, 1=Low, 2=Medium, 3=High, 4=AUTO. See table below.

Fan State	🌀	◄▢	◄▤	◄▥	AUTO
Off	on				
Low	on	on			
Medium	on		on		
High	on			on	
Auto	on				on

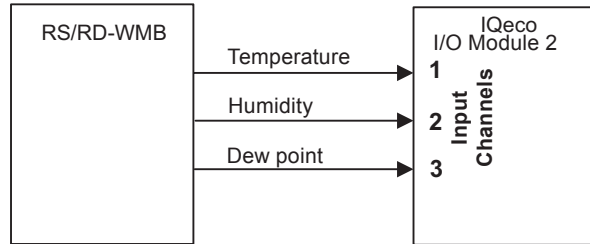| Mode	Description
5	4 position blind (0, 1, 2, 3). The state is not indicated by the icons. The value sent from the RD-WMB on each Fan function button press cycles between 0, 1, 2, 3. It can be used to control another device; for example, it can be used to control a window blind (0=static, 1=raise, 2=static, 3=lower).
6	5 position blind (0, 1, 2, 3, 4). The state is not indicated by the icons. The value sent from the RD-WMB on each Fan function button press cycles between 0, 1, 2, 3, 4. It can be used to control another device.

Use with IQeco

Connecting the RS/RD-WMB to the IQeco makes additional I/O channels available to the controller. The RS/RD is considered to be an additional I/O module (I/O module 2) of WMB display type.

Note: For a controller to make use of the RS/RD in its strategy, it must be configured with a WMB display type I/O module.

This gives additional I/O channels (the number being dependent on the RS/RD-WMB type), and some fixed mapping to the controller variables.

I/O Channels: The additional I/O channels are shown in the diagram below;

Sensor	IQeco input channel	Description
Temperature (RS/RD-WMB-Txx)	I/O module 2 channel 1	The RS/RD-WMB's temperature sensor is scaled into °F, or °C according to the units set up in S31 in the controller. To display a temperature value on the RD-WMB the required value must be linked to S31 which is read by the RS/RD-WMB. In the standard strategies S31 is used for both reading and displaying the temperature which allows a RS/RD-WMB to be connected without the need to modify the standard strategies.
Humidity (RS/RD-WMB-THx)	I/O module 2 channel 2	To display a humidity value on the RD-WMB the required value must be linked to S32 which is read by the RD-WMB.
Dew point (RS/RD-WMB-THx)	I/O module 2 channel 3	The RS/RD calculates the dew point value from its temperature and humidity values. It is calculated in °F, or °C according to the units set up in S31 in the controller The dewpoint value cannot be displayed on the RS/RD.

The sensor values are sent to controller every 15 s.

To read one of the RS/RD's values into the strategy an external sensor with a sensor type of '112, WMB pre-scaled' (which is a pre-configured sensor type that leaves the value received from the RS/RD-WMB unchanged) must be configured to read its input value from the relevant channel of I/O module 2. This value can then be used in the strategy as required.

RS/RD-WMB Mapping: The other values transferred to and from the RD are mapped as follows:

Controller	RS/RD-WMB Variable	Description
K44	Temperature Setpoint:	Input to/output from RD-WMB. Decrease/increase will decrement/increment the setpoint by 0.5. The value can only be set within the knob module's adjustment range (B to T). These are indicated on the graphics version of the change setpoint display. The new value is sent from the RD-WMB when the '✓' button is pressed, and sent from the controller if K44's value changes in the controller.
S10	Occupation State	Input to RD-WMB. The RD-WMB will indicate the occupation state (occupied 🏠 or unoccupied ⌂) according to the enumerated output of S10 (0 = occupied, 1 = unoccupied, 2 = bypass, 3 = standby). The RD-WMB will indicate occupied for states 0, 2, and unoccupied for states 1, 3. If the value of S10 is set to 255, neither occupation icon is displayed.
S31	Temperature Display	Input to RS/RD-WMB. The RD-WMB will use the value of S31's output for its temperature display. The RS/RD-WMB also reads the units from S31 (the RD-WMB displays them). The units must be set up as either DegC, or DegF. The sensor module may be configured with a non-zero offset, so the displayed value may be different from the Local temp measured by the RD-WMB.
S32	Humidity Display	Input to RD-WMB. The RD-WMB will indicate the humidity The value of the sensor module output is sent from the controller to the RD-WMB where it is displayed.

Controller	RS/RD-WMB Variable	Description
S34	CO_2 Concentration Display	Input to RD-WMB. The RD-WMB will indicate the CO_2 concentration The value of the sensor module output is sent from the controller to the RD-WMB where it is displayed.
S39	Outside Air Temperature Display	Input to RD-WMB. The RD-WMB will indicate the Outside Air Temperature (this comes from the strategy not the RD-WMB itself). The value of the sensor module output is sent from the controller to the RD-WMB where it is displayed. The RD-WMB uses the units (DegC, or DegF) from S31.
W1	Occupation Override	Input to/output from RD-WMB. The RD-WMB's occupation override button (⌂/🏠) will toggle the occupation override state. The new state is sent from the RD-WMB when the button is pressed, and sent from the controller if W1's state changes in the controller. ON = occupied.
K45	Fan Speed	Input to/output from RD-WMB. The fan button (🌀) will step through the fan speeds available according to the Fan Configuration. The new value is sent from the RD-WMB when the button is pressed, and sent from the controller if K45's value changes in the controller. The value of K45 is set as follows: 0 = off, 1 = Low Speed or On (Mode 2), 2 = Medium Speed, 3 = High Speed, 4 = Auto, 255 = On (modes 1 and 2).

When creating strategies for use with RS/RD-WMB it is recommended that sensors 32 to 39 are not used as they are allocated for possible future developments

Note: The RS/RD-WMB's internal sensor values are monitored by the controller, and can then be processed by the controller's strategy before being made available for the RD-WMB to display from the sensor module outputs. So the value displayed can be different to the value measured by the RD-WMB's internal sensor .

Error Display: If the space temperature value is not received within 3 to 6 minutes the display will show 'ERR'.

PIN (RD-WMB only)

The unit is pre-programmed with a default 4 digit PIN to protect entry to the Settings Menu.

COMPATIBILITY

The RS/RD-WMB is compatible with IQeco with firmware version 2 or greater.

IQeco standard strategies can use the RS/RD-WMB without any further engineering. For a custom strategy to make use of the RS/RD-WMB it must be configured with a WMB display type I/O module, and (for RD-WMB) it must use the mappings described earlier.

FIELD MAINTENANCE

The RS-WMB and RD-WMB require virtually no routine maintenance.

DISPOSAL

COSHH (Control of Substances Hazardous to Health - UK Government Regulations 2002) ASSESSMENT FOR DISPOSAL OF RS/RD-WMB . No parts affected.

RECYCLING ♻.
All plastic and metal parts are recyclable. The printed circuit board may be sent to any PCB recovery contractor to recover some of the components for any metals such as gold and silver.

WEEE Directive:

At the end of their useful life the packaging and product should be disposed of by a suitable recycling centre.

Do not dispose of with normal household waste.
Do not burn.

INSTALLATION

The RS/RD-WMB should be mounted on a standard electrical back box or front panel using two screws. The installation involves:

        Mounting unit
        Connecting to controller for power and signal.
        Configuring controller
        Configuring RS/RD-WMB
        Testing operation

The installation and configuration procedure is covered in the RS/RD-WMB installation instructions (TG201349).

ORDER CODES

RS-WMB-T   Room Sensor for use with controller with WMB wallbus (e.g. IQeco). It has local sensor temperature sensor,

RS-WMB-TH   Room Sensor for use with controller with WMB wallbus (e.g. IQeco). It has local temperature sensor, local humidity sensor, and dew point output.

RD-WMB-T   Room Display for use with controller with WMB wallbus (e.g. IQeco). It has local temperature sensor, setpoint control, occupation override, occupation status display, and fan speed control. It also has the ability to display CO_2 concentration and outside temperature values from the controller.

RD-WMB-TH   Room Display for use with controller with WMB wallbus (e.g. IQeco). It has local temperature sensor, local humidity sensor, dew point output, setpoint control, occupation override, occupation status display, and fan speed control. It also has the ability to display CO_2 concentration and outside temperature values from the controller.

SPECIFICATION

ELECTRICAL

Buttons	:(RD-WMB only) 4 buttons on front panel: 2 programmable function buttons and raise/lower buttons
Display	:(RD-WMB only) Backlit LCD matrix.
Communication	:WMB wallbus. Two wire bus for connection of display units to controller. Polarity independent. Bus length up to 60 m (200 ft).
Temperature Sensor	:Solid state
Temperature range	:-40 °C (-40 °F) to +65 °C (+149 °F)
Temperature Accuracy	:±0.2 °C at 25 °C (±0.36 °F at 77 °C)

Humidity (RS/RD-WMB-T-H-x only)	
Humidity Range:	0 to 90 %RH
Humidity Accuracy:	±3 %RH from 20 to 80 %RH

Setpoint Control	:(RD-WMB only) Increment/decrement by 0.5

MECHANICAL

Dimensions	:84 mm (3 5/16") x 117 mm (4 5/8"") x 24 mm (15/16") from electrical back box
Material	
Main module	:ABS
Back plate	:ABS
Weight	:103 gms, (0.23 lbs)
Protection	:IP30
Connections	:Polarity independent, 2 part connector with 2 screw terminals for 0.33 to 0.82 mm^2 (22 to 18 AWG) cross section area cable.

ENVIRONMENTAL

Operating Temperature: 0 °C to 50 °C (32 °F to 122 °F)
Shipping Temperature: -40 °C to 65.5 °C (-40 °F to 150 °F)

Approvals:	CE, UL94-V0 plastic enclosure; FCC Part 15, Class B

This data sheet refers to firmware version 1.2.0

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