



# WDCOCC

## Workplace Data Collector Occupancy Installation Manual



# User Manual

## User Manual Version History

1.0	5 <sup>th</sup> October 2012	First Release
1.1	12 <sup>th</sup> October 2012	added addressing and frequency sections.
1.2	13 <sup>th</sup> October 2012	Added EN test details.
1.3	14 <sup>th</sup> October 2012	Corrected antenna colours
1.4	5 <sup>th</sup> March 2013	Graphics update
1.5	28 <sup>th</sup> May 2013	Software description
1.6	9 <sup>th</sup> September 2013	New pictures of product
1.7	14 <sup>th</sup> November 2013	FCC approval
1.8	15 <sup>th</sup> July 2014	Frequencies added for India & Singapore
1.9	17 <sup>th</sup> July 2014	Label artwork modification
1.10	19 <sup>th</sup> August 2014	FCC ID modified to correct standard

## Hardware Version History

3.1	October 2012	First production release
-----	--------------	--------------------------



# WDCOCC

## Workplace Data Collector Occupancy

# User Manual

© Copyright Inotec Ltd. 2012

All rights reserved.

*No part of this manual may be reproduced in any form, by print, photoprint, microfilm or any other means without written permission from the publisher.*

*In spite of all care taken in composing the text and illustrations, neither the editor nor the publisher can accept any liability for possible damage that might result from any fault that may be in this publication.*

*Information in this document is subject to change without notice and does not represent a commitment on the part of Inotec.*

# Index

<b>1</b>	<b><i>Warnings and Statements</i></b>	<b>5</b>
<b>1.1</b>	<b>Introduction</b>	<b>5</b>
<b>1.2</b>	<b>Warnings</b>	<b>5</b>
<b>1.3</b>	<b>Electro-static Discharge (ESD)</b>	<b>6</b>
<b>1.4</b>	<b>Europe – CE Declaration of Conformity</b>	<b>6</b>
<b>1.5</b>	<b>Electrical Safety &amp; Safety notices</b>	<b>6</b>
<b>1.6</b>	<b>Warranty and support services</b>	<b>7</b>
<b>1.7</b>	<b>USA – Federal Communication Commission Interference Statement</b>	<b>7</b>
<b>1.8</b>	<b>IC Canada statement</b>	<b>8</b>
<b>1.9</b>	<b>Patent</b>	<b>9</b>
<b>1.10</b>	<b>WEEE statement (Waste, Electrical and Electronic Equipment)</b>	<b>9</b>
<b>1.11</b>	<b>RoHS – Restriction of Hazardous Substances</b>	<b>9</b>
<b>1.12</b>	<b>FCC ID Label position</b>	<b>9</b>
<b>2</b>	<b><i>Introduction</i></b>	<b>10</b>
<b>3</b>	<b><i>Opening the Case</i></b>	<b>11</b>
<b>4</b>	<b><i>WDCOCC components</i></b>	<b>13</b>
<b>5</b>	<b><i>Installation Instructions</i></b>	<b>15</b>
<b>6</b>	<b><i>Software Information</i></b>	<b>16</b>
<b>7</b>	<b><i>Hardware Details</i></b>	<b>21</b>
<b>8</b>	<b><i>Installation Instructions</i></b>	<b>26</b>
<b>9</b>	<b><i>RF Network</i></b>	<b>27</b>

# 1 Warnings and Statements

## 1.1 Introduction



The exclamation mark within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (service) instructions in the literature accompanying the apparatus.

Read this manual before attempting to start up or service the product. Retain the manual for future use. Inotec accepts no responsibility for any consequential loss, failure or damage resulting from a failure to heed any warnings or to follow the instructions.

## 1.2 Warnings



The WDC may be operated only from the built-in 3 x AAA battery pack. Operation from other supplies is not authorised.



The WDC requires 3 x good quality AAA batteries.

### 1.3 Electro-static Discharge (ESD)

Electrostatic discharge can damage or impair electrical circuitry. It occurs when electronic components are handled improperly.

If removing or replacing the circuit board inside the WDC case, always use a grounded anti-static wrist strap and grounded electrostatic discharge mat. If no wrist strap is available, ground yourself by touching the metal part of any grounded chassis while handling the circuit board.

### 1.4 Europe – CE Declaration of Conformity

We, Inotec Ltd, declare this equipment complies with all relevant CE and FCC standards including:

EN 301 489-3v1.4.1 & EN 301 489-1v1.8.1

EN 300 220-1v2.3.1 & EN 300 200-2v2.3.1

EN60960-1:2006, A11, A1, A12

We, Inotec Ltd, hereby declare that this product is in compliance with the essential requirements and other relevant provisions of directive 1999/5/EC.

This product can be used in but is not restricted to the following countries:

UK, Germany, Austria, Belgium, Switzerland, Netherlands, Luxembourg, Italy, France, Ireland, Spain, Portugal, Sweden, Norway, Denmark, Finland, Czech Republic, Hungary, and Greece.

### 1.5 Electrical Safety & Safety notices

This equipment complies with CE, ETSI, ETL and FCC requirements, please take some time to read through the safety notices before installing the product, please observe all safety markings and instructions when using this product.

## 1.6 Warranty and support services

### Technical support

Should you need technical assistance please contact Inotec Ltd.

Tel: +44 (0) 1702 206 578

Fax: +44 (0) 1702 208798

Email: [info@inotecuk.com](mailto:info@inotecuk.com)

Web: [www.inotecuk.com](http://www.inotecuk.com)

### Return Merchandise Authorisation

Please contact via numbers above to receive a RMA number before sending your product back to us for repair. Products sent without RMA number will be returned to sender.

### One year limited warranty

- This device is guaranteed against manufacturing defects for one full year from the original date of purchase.
- This warranty is valid at the time of purchase and is non transferable.
- Damage caused by accident, misuse, improper storage, and/or uncertified repairs are not covered by this warranty.
- Warranty is only valid in country of purchase.
- We assume no liability that may result directly or indirectly from the use or misuse of these products.

## 1.7 USA – Federal Communication Commission Interference Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

This Transmitter must be installed to provide a separation distance of at least 20 cm from all persons.

Changes or modifications not expressly approved by the party responsible for compliance could void the users authority to operate the equipment.

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

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.

FCC ID: 2ABOOWDCOCC-SING

## 1.8 IC Canada statement

This device complies with Industry Canada license exempt RSS standard(s). 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.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.



## 1.9 Patent

The WDC is protected by patent PUBLISHED No. 1218199.6

## 1.10 WEEE statement (Waste, Electrical and Electronic Equipment)



The WEEE directive places obligation on all EU-based manufacturers and importers to take back the electronic products at the end of their useful life.

Inotec Ltd accepts its responsibility to finance the cost of treatment and recovery of redundant WEEE in accordance with the specific WEEE recycling requirements at this date 14<sup>th</sup> November 2013.

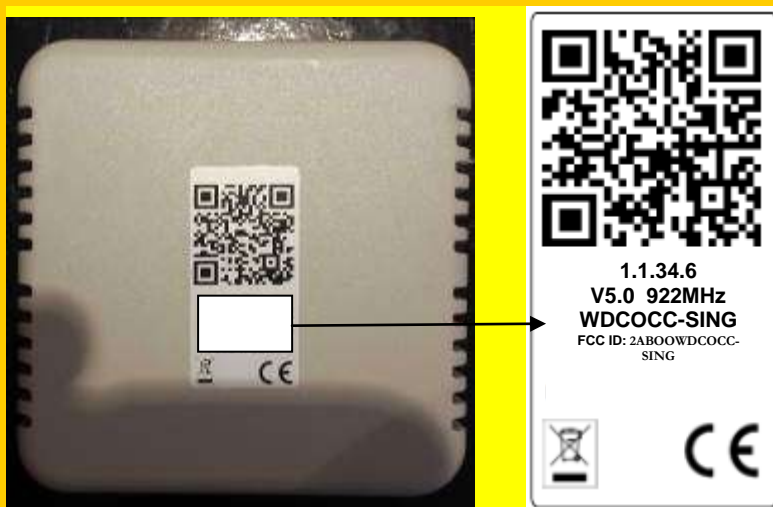
The symbol shown, indicates that this product must not be disposed of with other waste. Instead it is the users responsibility to dispose of their waste electrical and electronic equipment by handing it over to an approved reprocessor, or by returning it to, Inotec Ltd for reprocessing.

## 1.11 RoHS – Restriction of Hazardous Substances



Inotec Ltd is fully aware of the legislation and has taken steps to ensure that all products are RoHS compliant and as a producer of product ensures that we meet the new regulations

## 1.12 FCC ID Label position



## 2 Introduction

The Inotec Workplace Data Collector (WDC) for occupancy is designed to detect the occupancy of a desk or workplace position within an office environment. Occupancy data is transmitted wirelessly to an Inotec wireless Access Point (AP) and from there to a central database where it can be used to make informed decisions regarding the workplace utilisation and efficiency.

The WDC can be located up to 80m away from an Access Point. With objects in the way a more typical range is 50m.

The battery powered WDC is designed for long life. The WDC batteries will typically last over 3 years. However, to ensure continuous operation new batteries should be fitted every 36 months as part of a routine maintenance schedule.

This manual details the WDC installation and service procedure.

### 3 Opening the Case

1) Use a crosshead screwdriver to remove the fixing screw on the side of the case as shown in Figure 1.0



*Fig. 1.0 WDC Tamper Screw Removal*

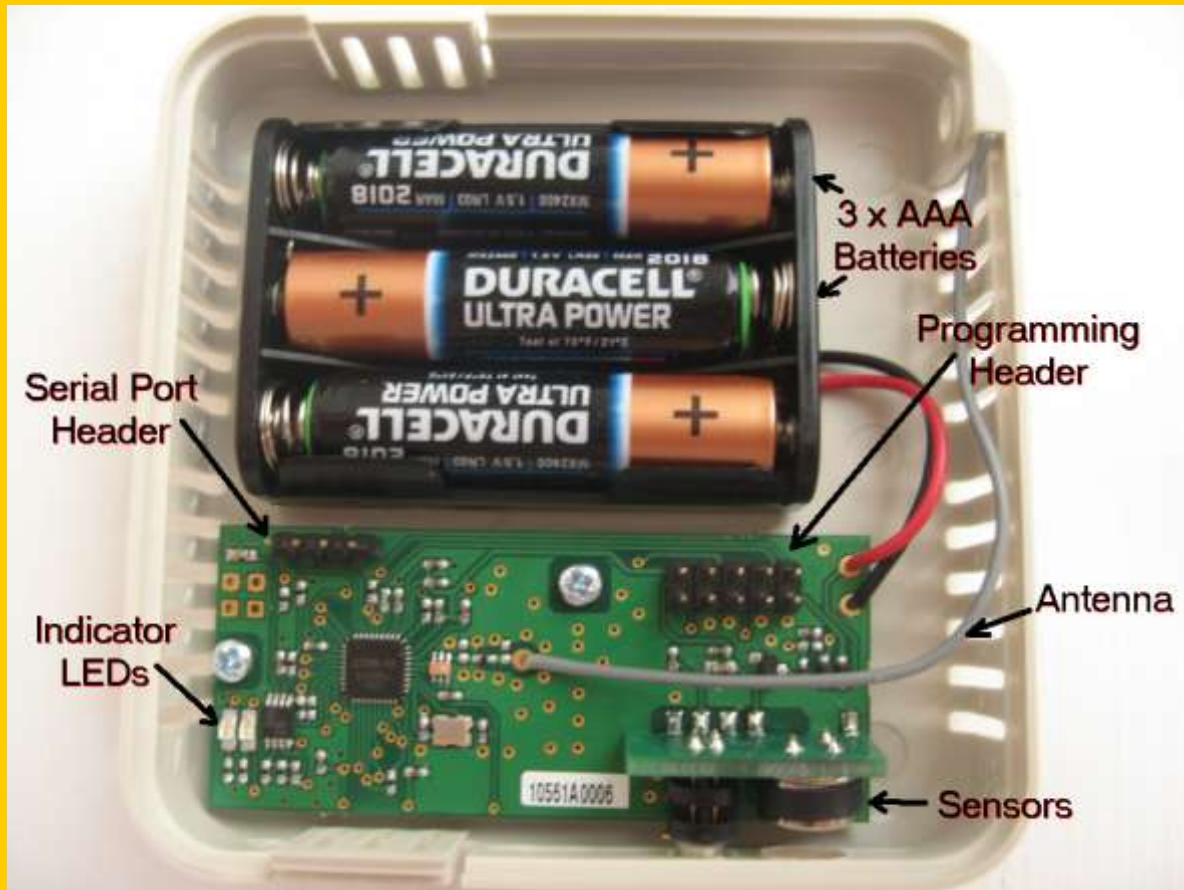
2) To remove the lid, simultaneously depress the small square grills on either side of the case to release the catches, and then lift the lid off, as shown below.



*Fig. 2.0 WDC Lid Removal*

## 4 WDCOCC components

1) WDCOCC components as shown in Figure 3.0



*Fig. 3 WDC Components*

Name	Function
Serial Port Header	Allows connection to a PC via a suitable USB/RS232 adapter board. This port can be used for WDC system configuration and system diagnostics.
Indicator LEDs	These flash alternately for 10 seconds on power-up
Sensors	PIR and IR sensors used to detect workstation occupancy
Antenna	Used to wirelessly transmit occupancy data to the host via the Inotec Access Point (AP)
Programming Header	For engineering use only. Allows the wireless chip to be programmed via a suitable Texas Instruments 'CC Debugger' cable.

Batteries	Provides power to the circuit board.
-----------	--------------------------------------

*Table 1.0 WDC Component Functions*

2) The WDC is factory configured to communicate at one of four different operating radio frequencies – depending on the region.

These BASE frequencies are 315MHz, 434MHz, 868MHz and 915MHz. The most common frequency is 868MHz for European and Middle East communications, and 915MHz for the USA, 922 FOR Singapore and 866Mhz for India.

3) A different antenna length is required for each frequency. These antennae are colour coded as follows:

Frequency	Antenna Colour
315MHz	Orange
434MHz	Yellow
866–868MHz	Grey
915–928MHz	White

*Table 2.0 WDC Antenna Colours*

## 5 Installation Instructions

- 1) Open the WDC case and ensure that 3 x good quality AAA batteries are fitted in the correct orientation as shown in the diagram printed on the back wall of the battery holder.



*Fig. 4 Empty Battery Holder*

- The WDC is supplied from the factory without batteries fitted. Only good quality batteries should be used.
- 2) Upon fitting the batteries the red and green indicator LEDs will flash for 10 seconds, indicating the unit is functioning correctly. If the LEDs do not light up then check the batteries are fitted correctly.
  - 3) Replace the lid onto the base plate ensuring the catches on both sides of the unit click into place. Make sure the antenna wire is kept safely inside the case and does not get caught or damaged between the lid and base.
  - 4) Insert the anti-tamper screw and tighten using a crosshead screw driver as shown in Figure 1.0

# 6 Software Information

- 1) Once the batteries have been installed, the WDC–Occupancy sensor will go through a software start up procedure, Using the inotec WEMS PC software package and to ensure correct operation the following should happen in order;

Start-up



Ready

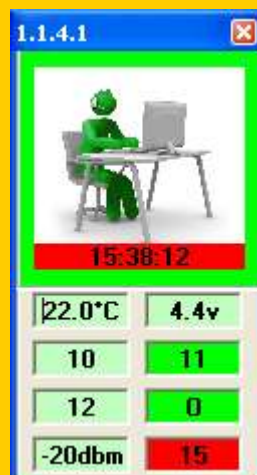




Unoccupied



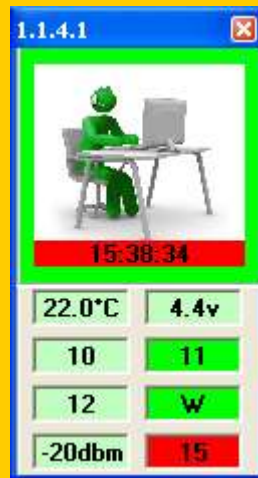
Occupied



Watchdog, Unoccupied



## Watchdog, Occupied



2) The key chart for the software graphic symbols for start up, is as follows;

- Power on WDC, or hand over sensor = 'S' = Start-up
- Walk or move away from sensor to enable the WDC to measure the back ground temperature.
- 15 seconds later = 'R' sensor is ready for operation
- Then it's 'U' for Unoccupied;
- Or 'O' for Occupied.
- 'H' for Hot Seat Compensation ~ 3 Mins
- 'W' for Watchdog, ~ 10mins.
- 'A' for Ambient temperature change, approx 1°C (10 Units)

3) WDC will only transmit on change of state (occupied/unoccupied), but will send data every 10 minutes (Watchdog), to confirm operational.

- WDC transmits when ambient value changes by 1 degree
- WDC will automatically determine the unoccupied IR sensor value and calculate occupied status as a temperature approximately 3 degrees above unoccupied level.
- The WDC utilises the PIR sensor to detect movement as an indication of activity.
- WDC uses the PIR sensor to indicate unoccupied state, when person has left.

- WDC transmits battery voltage level
  - WDC transmits the software version and the WDC type
  - The WDC transmits but does not receive. Receiving is possible but would drastically reduce battery life.
- 4) The WDC can be updated by opening the external case and connecting to the programming interface provided. No “over the air” update is included at this stage
  - 5) A ‘reset/test’ function is provided by a person holding their hand directly over the WDC sensors for 5seconds. This will allow the WDC to re-establish, re-learn, the background temperature. It is intended for use during WDC installation or on relocation of the sensor. This function will also be automatically enabled if the sensor detects no significant temperature changes over 3 minutes. The intent is to allow the sensor to automatically adjust to changing ambient changes over time

#### 6) WDC Occupancy software process

- The WDC resets its Auto Level at the end of every 15s of **low Ir activity** AND the WDC is **Unoccupied**.
- A high negative change on the PIR value will set the WDC as **Unoccupied**.
- The WDC resets its Auto Level at the end of 3mins of **low Ir and PIR activity**, with the WDC in **Occupied state**.
- In hot seat, the status can be sent from the WDC to allow the SQL to deduct 3 mins from the "unsure" WDC occupancy. ("**Warm Seat**" situation). Not required by JCI at this point.
- The "**Hand on Sensor**" reset should be maintained and improved.
- Ambient will be converted to Degrees C inside the WDC. This indicates the individual workplace **working desk environment** temperature situation.
- Pir activity can be used to indicate the **active use** of the workplace seat.
- Battery voltage is **always** transmitted
- Heartbeat transmission should be 10mins.
- 3 modes of data transfer should be considered: –

- Transmit every **1 second** for detailed debug.
  - Transmit on **change** of Ir for lower level Debug.
  - Transmit on **change** of Occupancy, two packets of information are sent to ensure one gets to the receiver.
- 7) Sensor type and software version will be held and transmitted for remote verification.
- 8) PIR value is the range of the PIR between transmissions.

## 7 Hardware Details

### 1) Hardware WDC Occupancy details

The WEMS workplace data collector (WDC) is utilised to provide occupancy data from desk workplace positions within an office environment, The WDC will be utilised in a normal office environment, with temperatures ranging from 18 to 25 degrees C, with normal humidity and should not be pointed into direct sunlight or heat sources.

- 2) The Workplace data Collector WDC will provide a battery-powered unit, including a wireless link, for each workplace desk area for detection of occupancy or no occupancy of change in IR and PIR levels.
- 3) Typical wireless range of a WDC is 80 metres line of sight; with obstructions, the effective range is reduced to approximately 50 metres for normal office applications.
- 4) WDC will be battery powered, with an approximate life of >24months (subject to utilisation transmissions), we recommend changing batteries as a planned maintenance action every 36 months. In addition, the battery level will be transmitted and can be included as part of facility maintenance.
- 5) The WDC will run off 3xAAA batteries, a good quality battery must be utilised.
- 6) Data will be transmitted at different frequencies depending on country or regional requirements; We have provided the following ISM bands for global regions. This data can change over time. Access point frequencies are: –
  - Japan – 315Mhz
  - 434 MHz Asia pacific regions, including China, Philippines, Australia. **(Global)**
  - 866Mhz India
  - 868Mhz UK & Europe
  - 915Mhz North & South America
  - 922Mhz Singapore

- 7) WDC will be dedicated to the ISM frequency band required for that region and country. Taking into account local power settings and duty cycles.
- 8) WDC will be tested accredited and validated for the region it will operate in, as shown below proposed accreditation, self certification will take place after testing products; Others will be added as more local country standards are adopted.
  - ETSI EN 300 220, – UK and Europe
  - FCC CFR47 Part 15, FCC – US
  - ARIB RCR STD-T30, ARIB STD-T67 and ARIB STD-T96 – Japan
- 9) WDC will transmit on low power RF to maximise the battery life. (Tweet and Sleep)
- 10) There are no tamper proof devices within the WDC, it is assumed the data can be translated and sampled by JCI, to confirm if WDC is being tampered with.
- 11) The WDC will only transmit on change of state (occupied/unoccupied), but will send data once, every 10 minutes, to confirm operational.
- 12) To stop data transmit event clashes with numerous WDC's transmitting simultaneously, the WDC will be programmed in to "listen before talk" mode to eliminate collisions.
- 13) Inotec will provide product traceability for all our products, in the following way; IP Address, QR Bar Code, Base Freq, Software Level, Product Symbol, Eng Level, Country via a label on the product. (TBE)
- 14) The WDC should be positioned under the desk centrally, approximately 500mm from the front of the desk or table; this will provide a reading range of 300mm from the front of the desk or table, 60 degrees angle.

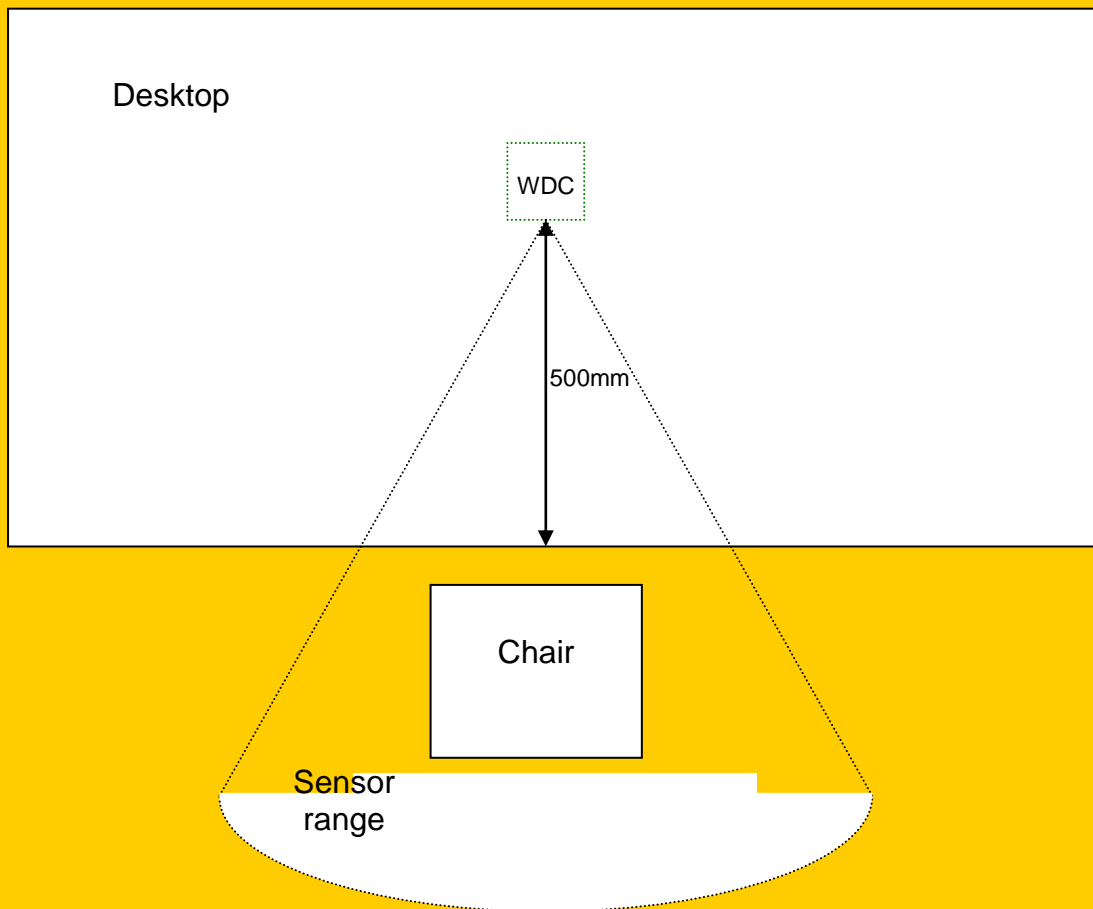
15) The WDC unit is now ready to be fitted under the desk to be monitored. The WDC can be fixed under the desk using double-sided adhesive pads, or by using the screw holes provided in the base as shown below



*Fig. 5 WDC Mounting under Desk*

The WDC must be installed under the desk, 500–300mm back from the front edge – directly opposite the place where the worker is likely to sit. The WDC will then detect up to 800mm from the installed position, providing 300mm sensing range from the desk as shown below:

*Fig. 6 Plan view of WDC position under desk*



When positioning the WDC, ensure that the sensors have a clear line-of-sight to the position where the user sits, with no obstructions in the way.

Ensure that the WDC is mounted flat against the underside of the desk. Note that the WDC has been designed so the sensors point slightly downward by default. This ensures the sensors are pointing down at the workstation occupant, and not upwards towards the underside of the desk.



Ensure that you leave enough space at the back of the unit to allow a finger to be inserted to depress the lid release catches so the lid can be removed for servicing or battery replacement.



*Fig. 7 WDC Lid Release Access*



For correct operation the WDC requires a normal office environment, with temperatures around 18 to 25 degrees centigrade and normal humidity. Therefore the WDC should not be placed in direct sunlight or near heat sources such as fan-heaters or radiators.

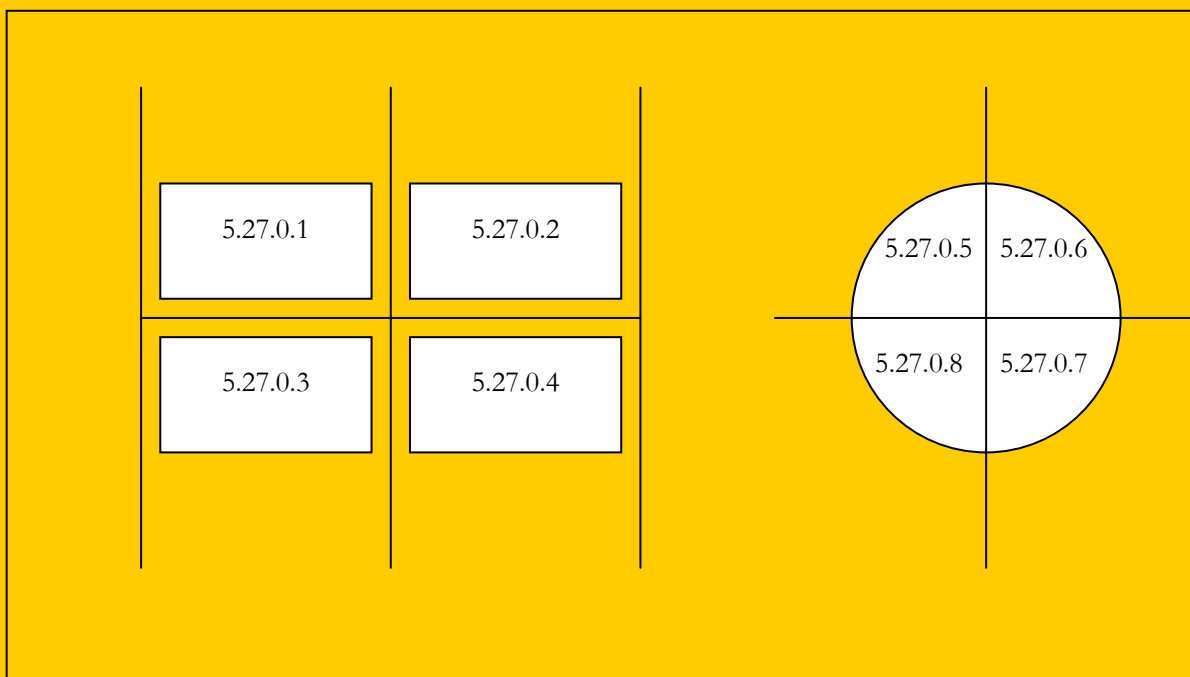
- 16) After securing the WDC in place the unit must be reset by holding your hand directly over the WDC sensors for 5 seconds. This forces the WDC to re-establish its background temperature. This reset operation should be performed whenever the WDC is moved or opened for servicing.

## 8 Installation Instructions

Each WDC has a unique serial number or 'address' which is printed on the case and factory programmed into the non-volatile memory of each unit. This serial number is wirelessly transmitted along with the occupancy state by each WDC.

The serial number consists of four numbers from 0-to-255, separated by a dot. For example: 0.0.0.0 to 255.255.255.255

- 1) Record the serial number of the WDC fitted to each desk on a printout of the office floorplan. This will allow the user to relate the occupancy data to specific desks within the office. An example office plan is shown below with the WDC address for each desk recorded.



*Fig. 8 Example Office Layout and WDC Addresses*

To be continued with procedure for checking that transmissions from all units are being received OK by the host.

## 9 RF Network

ILan WEMS network for short range ISM band frequencies

