AIR IOT - User Manual
(Webserver Edition)

Repro Supplies
3 Saligna Street
Unit 14 Saligna Park
Witfield, Boksburg
Office: +27 11 826 5364
Email: gavo@mweb.co.za
Web: reprosupplies.co.za

Contents *(Click on headings to jump to that selected section)*

Scan to download User Manuals

1. OVERVIEW

AIR IOT is an ESP32 based environmental monitor with a built in webserver. It displays live gauges on an RGB panel (LVGL) and serves a responsive UI (User Interface) over Wi Fi in AP and STA modes.

2. QUICK START

- Connect to AP SSID “IoT_Air” with password “repro123”.
- Browse to http://192.168.4.1/ (AP default), or use the IP shown on the Index page if STA is connected.
- Open Unit Setup to configure Wi Fi, MQTT, NTP, and (optionally) Static IP.

3. WEBSERVER ENDPOINTS

ENDPOINT	METHOD	PURPOSE
/	GET	Index page with device info & live values
/SensorReadings	GET	Auto refresh values (5 s)
/UnitSetup	GET/POST	Configure credentials, MQTT, intervals (restarts)
/UnitSetupDone	GET	Confirmation after save
/DateTimeUpdate	GET/POST	Set epoch/system time
/DateTimeUpdateDone	GET	Confirmation after time update
/IMU	GET	Plain text acceleration magnitude
/OTAUpdate	GET/POST	Password protected OTA upload
/Style.css	GET	Stylesheet

4. PASSWORDS & SECURITY

- AP Wi Fi Password: “repro123”
- OTA Update Password (/OTAUpdate): “9326”

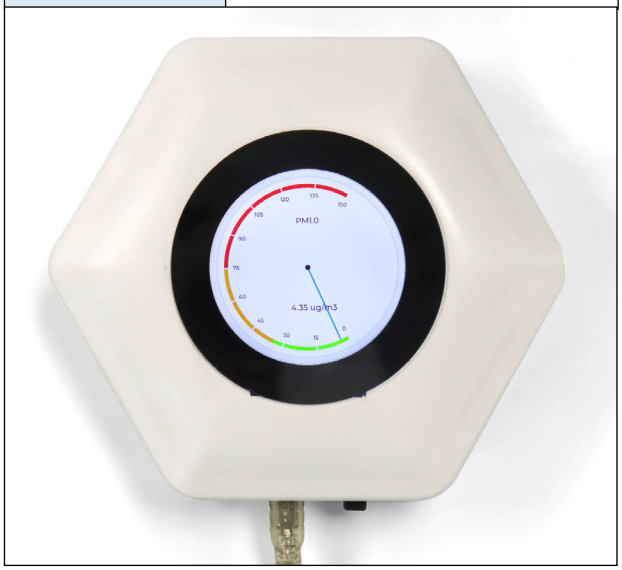
5. VALUES & UNITS DISPLAYED ON THE WEBSERVER

SENSOR	UNITS
Temperature (HDC1080)	°C
Humidity (HDC1080)	%
CO_2 (SCD4x)	ppm
CO_2 Temperature (SCD4x)	°C
CO_2 Humidity (SCD4x)	%
PM1.0 (SPS30)	µg/m³
PM2.5 (SPS30)	µg/m³
PM4.0 (SPS30)	µg/m³
PM10.0 (SPS30)	µg/m³
Acceleration (IMU)	g
SPL (DB Meter)	dBA

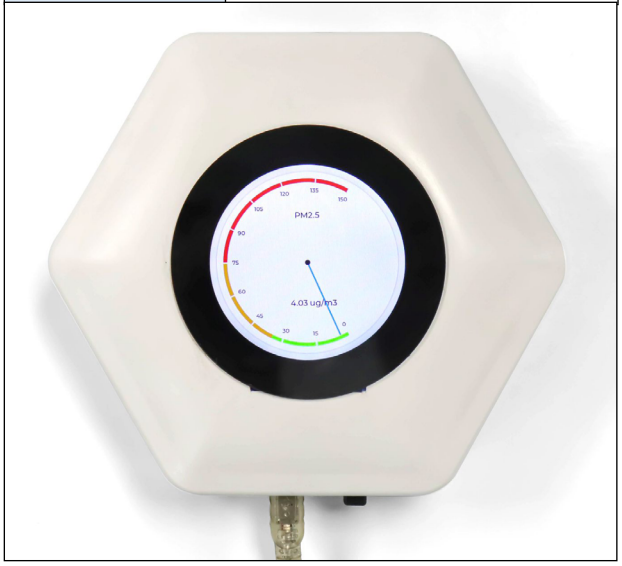
6. TFT GAUGES & RANGES

GAUGE	CO_2
RANGE	0–2000 ppm
COLOUR BANDS	0–1000 / 1000–1500 / 1500–2000

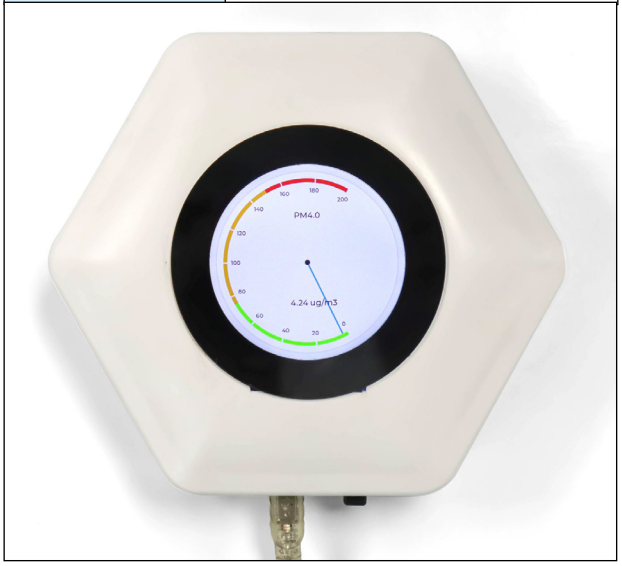
GAUGE	PM1.0
RANGE	0–150 µg/m³
COLOUR BANDS	0–50 / 50–100 / 100–150



GAUGE	PM2.5
RANGE	0–150 µg/m³
COLOUR BANDS	0–50 / 50–100 / 100–150

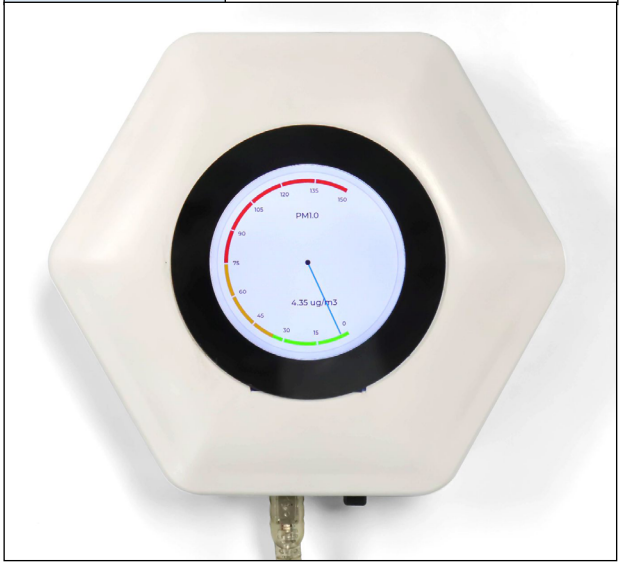


GAUGE	PM4.0
RANGE	0–200 µg/m³
COLOUR BANDS	0–75 / 75–150 / 150–200



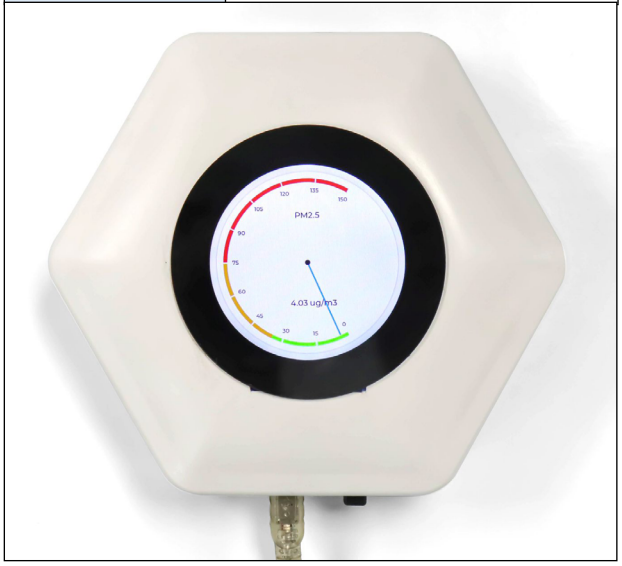
GAUGE	PM10.0
RANGE	0–300 µg/m³
COLOUR BANDS	0–75 / 75–150 / 150–300

GAUGE	SPL
RANGE	0–120 dBA
COLOUR BANDS	0–60 / 60–90 / 90–120

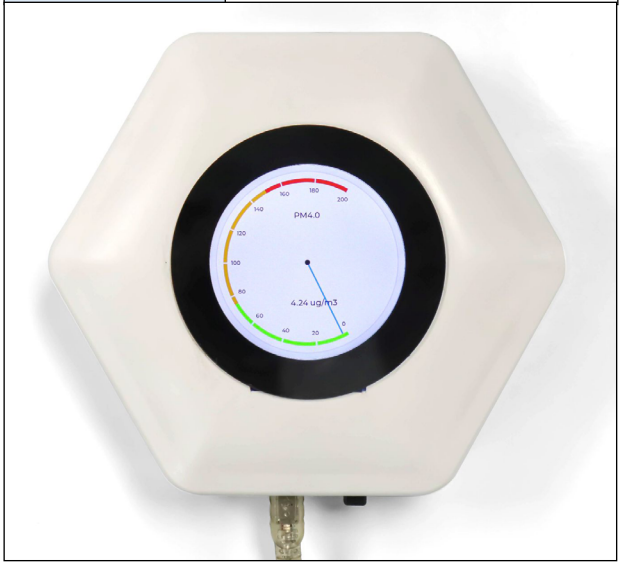


Back to TOC

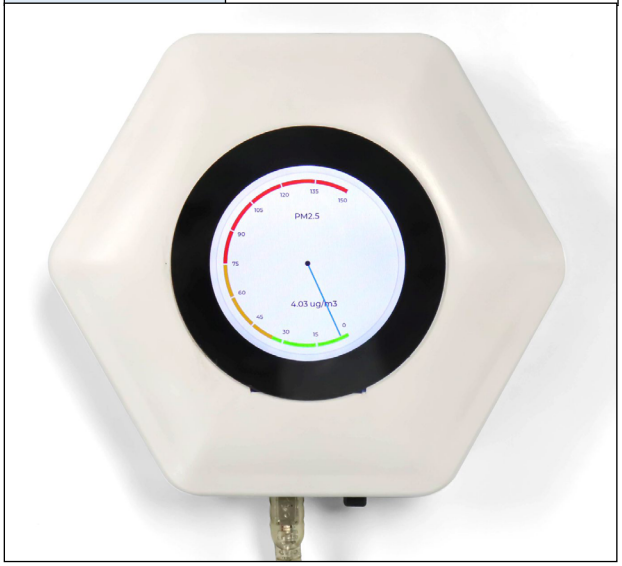
GAUGE	IMU (Accel)
RANGE	0–20 g
COLOUR BANDS	0–5 / 5–10 / 10–20



GAUGE	Temp (HDC1080)
RANGE	0–50 °C
COLOUR BANDS	0–15 / 15–25 / 25–35 / 35–50



GAUGE	Humidity (HDC1080)
RANGE	0–100 %
COLOUR BANDS	0–30 / 30–60 / 60–100



7. MQTT PUBLISHING

Broker: (set in Unit Setup):1883 Topic base: (set in Unit Setup) which default to the smartmonitoring.co.za site.

JSON keys: MACAddress, Temp_HDC, Hum_HDC, Temp_SCD, Hum_SCD, PM1.0, PM2.5, PM4.0, PM10.0, CO2, Accel, SPL

Example: {"MACAddress":"AA:BB:CC:DD:EE:FF","Temp_HDC":23.4,"Hum_HDC":46.1,"Temp_SCD":23.2,"Hum_SCD":45.8,"PM1.0":4.2,"PM2.5":7.8,"PM4.0":9.1,"PM10.0":10.5,"CO2":612,"Accel":0.98,"SPL":52.3}

8. UNIT SETUP (CONFIG SAVE & RESTART)

Defaults: SSID=(blank), NTP=pool.ntp.org, MQTT=(blank):1883, Topic=(blank) – to be completed by the user.
Saving settings writes to NVS (non-volatile storage) and schedules an automatic restart on the device.

9. OTA UPDATE

Use /OTAUpdate with password “9326”; upload a .bin. Device suspends sensor tasks, flashes, reboots.

10. TIMEKEEPING

SNTP is used for clock sync; /DateTimeUpdate allows setting epoch manually. DS3231 is kept in sync.

11. SENSOR SPECIFICATIONS (SHORT)

HDC1080 (TI) — Temperature & Humidity (I²C)	
Temperature accuracy	±0.2°C typical (25 °C)
Humidity accuracy	±2% RH typical
Ranges	0–100% RH, –40 °C to +125 °C (sensor rating; practical accuracy spec around room temperature)
SCD4x (Sensirion) — CO_2, plus T/RH (I²C)	
Measurement range	SCD40: 400–2,000 ppm; SCD41: up to 5,000 ppm (CO_2 output range up to 40,000 ppm for diagnostics)
Accuracy	SCD40 ±(50 ppm + 5% of reading) from 400–2,000 ppm; SCD41 tighter specs in 400–1,000 ppm and extended to 5,000 ppm
Response time	~60 s (τ63%)
SPS30 (Sensirion) — Particulate Matter PM1/2.5/4/10 (I²C/UART)	
Mass concentration range	0–1,000 µg/m³ for PM1.0, PM2.5, PM4.0, PM10.0
Precision	±10% (mass concentration), typical
SPL (DB Meter) — (I²C 0x48)	
Output	Instantaneous sound level in dBA (approximate), plus MIN/MAX registers
Range (typical)	0–120 dBA (application dependent; not a certified Class 1 instrument)

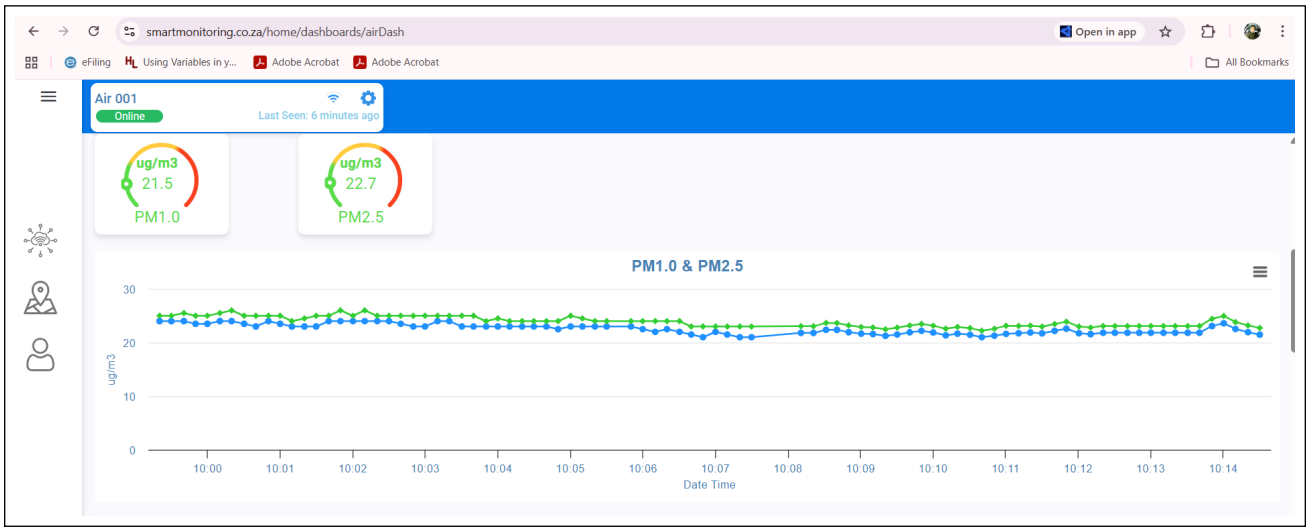
12. SMART MONITORING BACK END DASHBOARD

(Found at www.smartmonitoring.co.za) **Not all features shown below

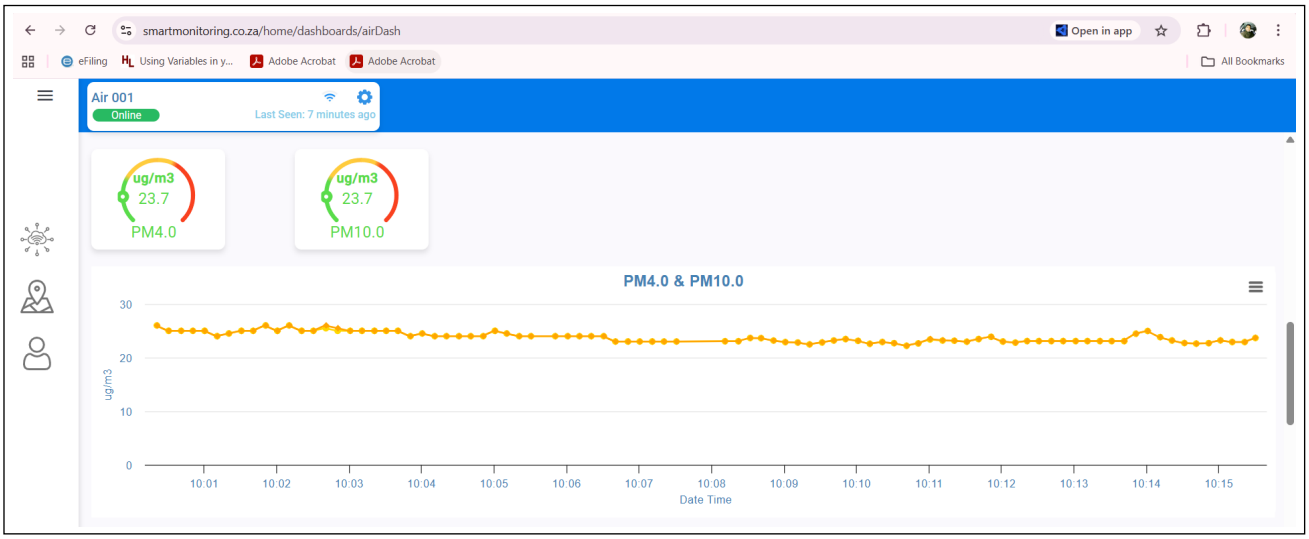
The Smart Monitoring main dashboard can be found below once the user and unit details have been registered on the website.

Below are the Screen shots from the Dashboard showing the different sensor Widgets and the graphs displaying their value over the set period set in the Webserver

Particulate Sensor measurement from 1.0 to 2.5

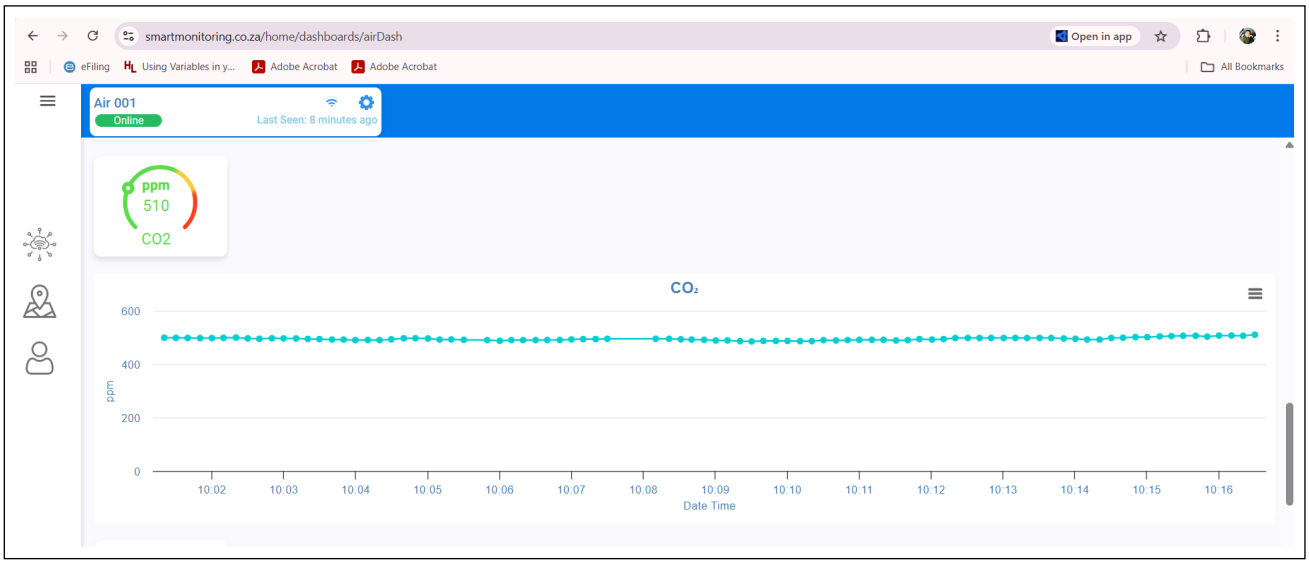


Particulate Sensor measurement from 4.0 to 10.0

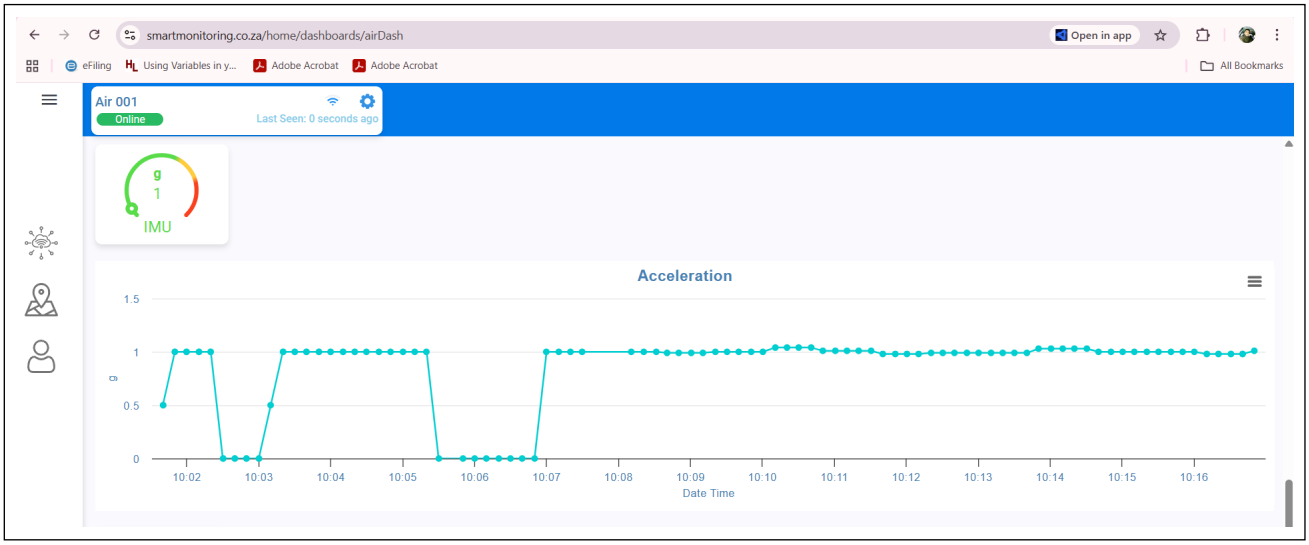


Back to TOC

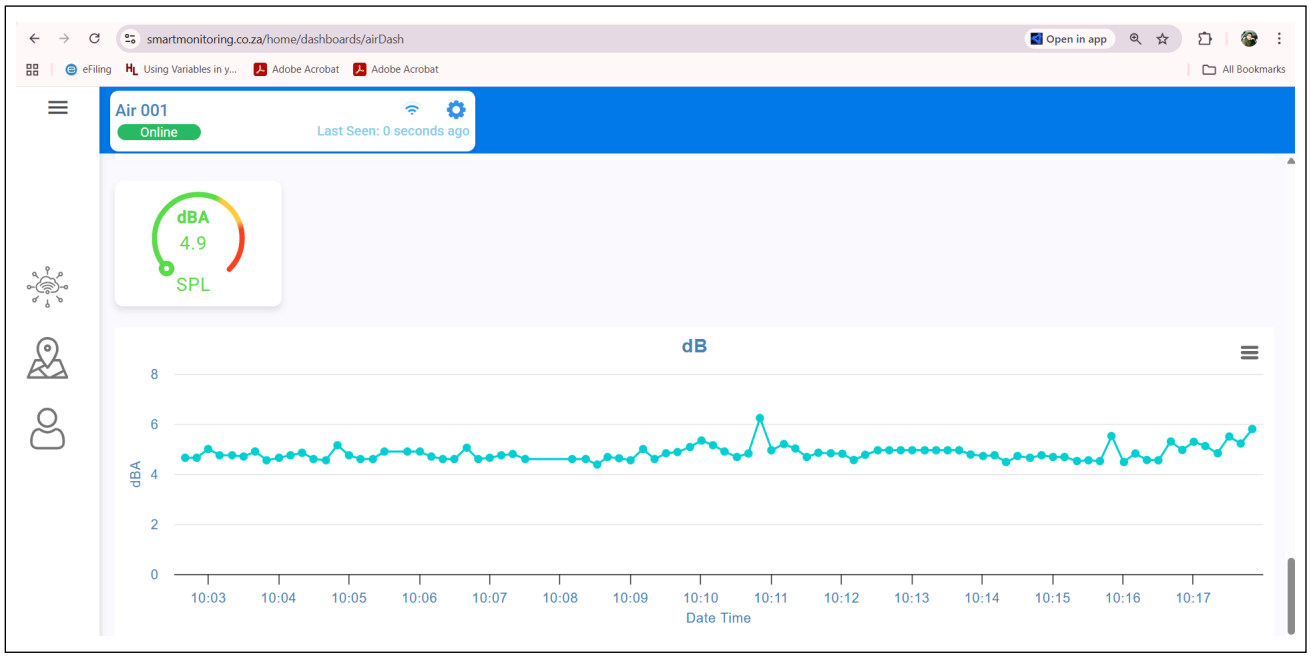
CO2 measurement



IMU Measurement



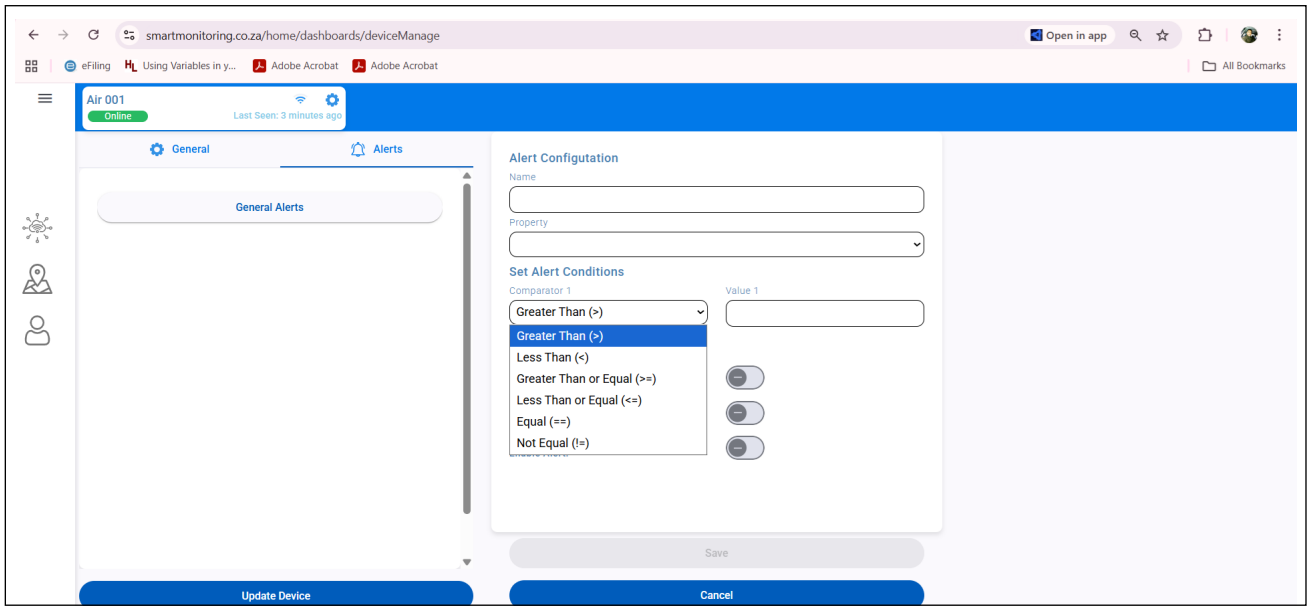
Sound Pressure Level (SPL) measurement shown in dBA

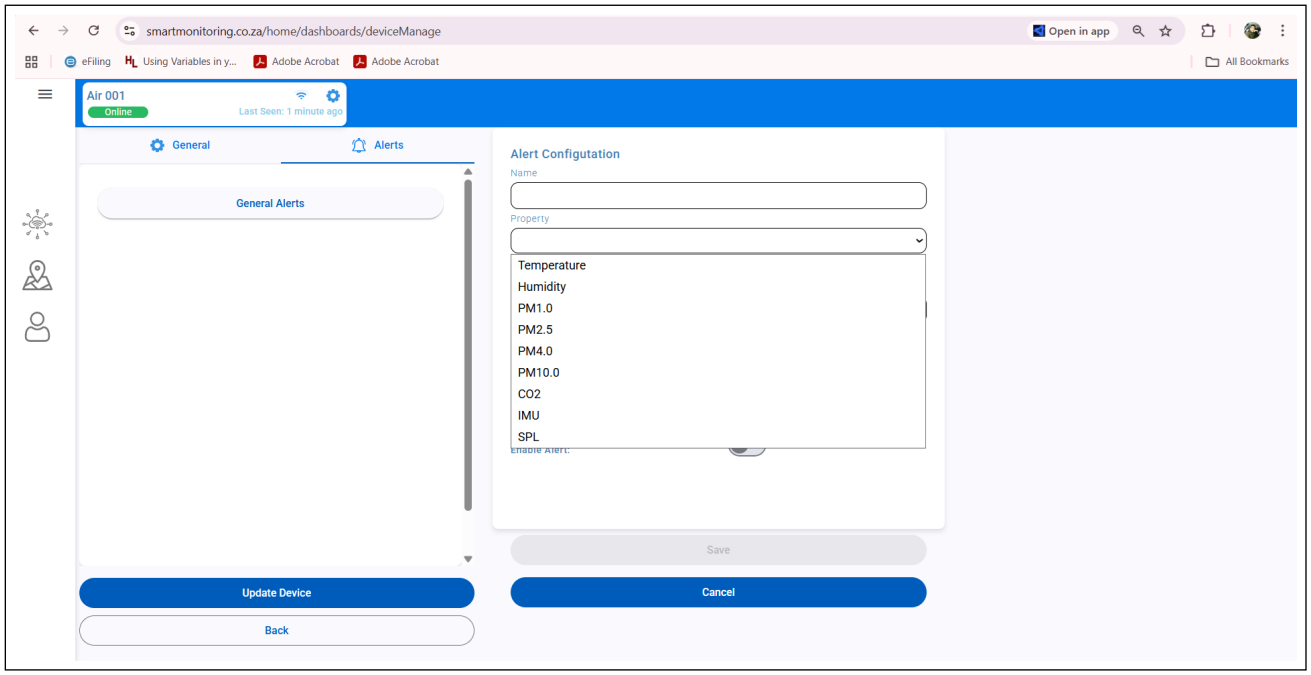


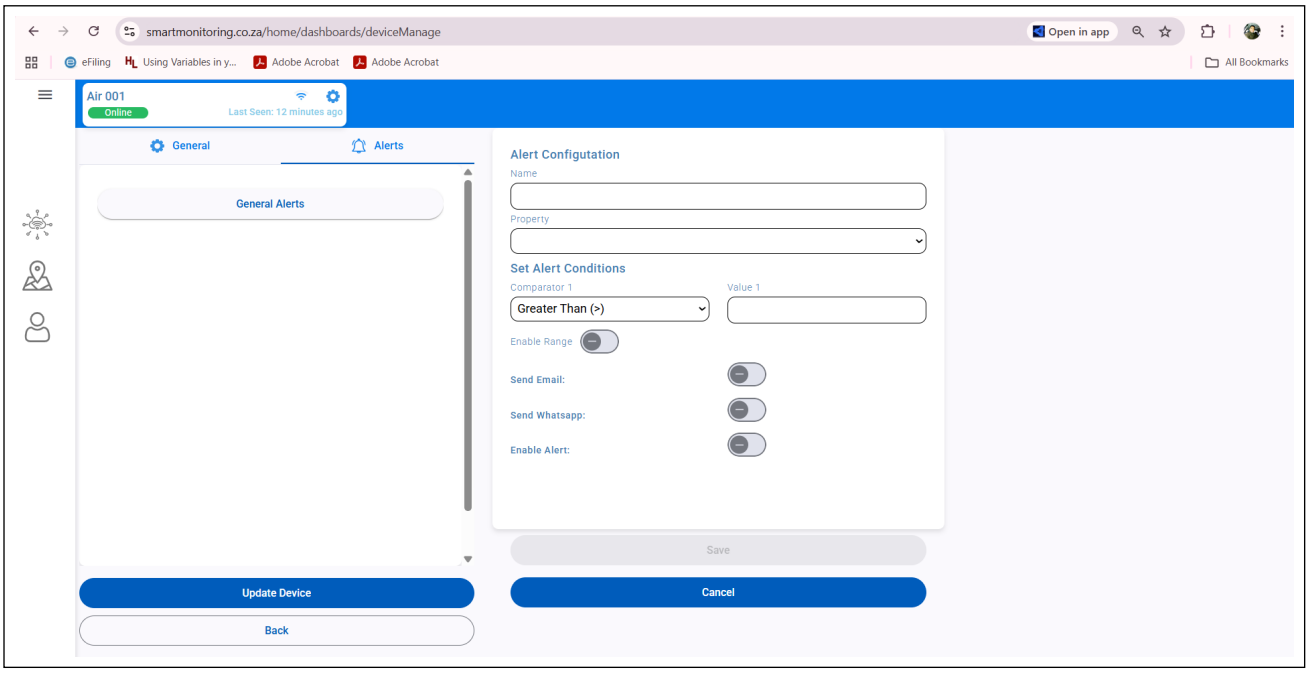
Temperature and Humidity Measurement

Back to TOC

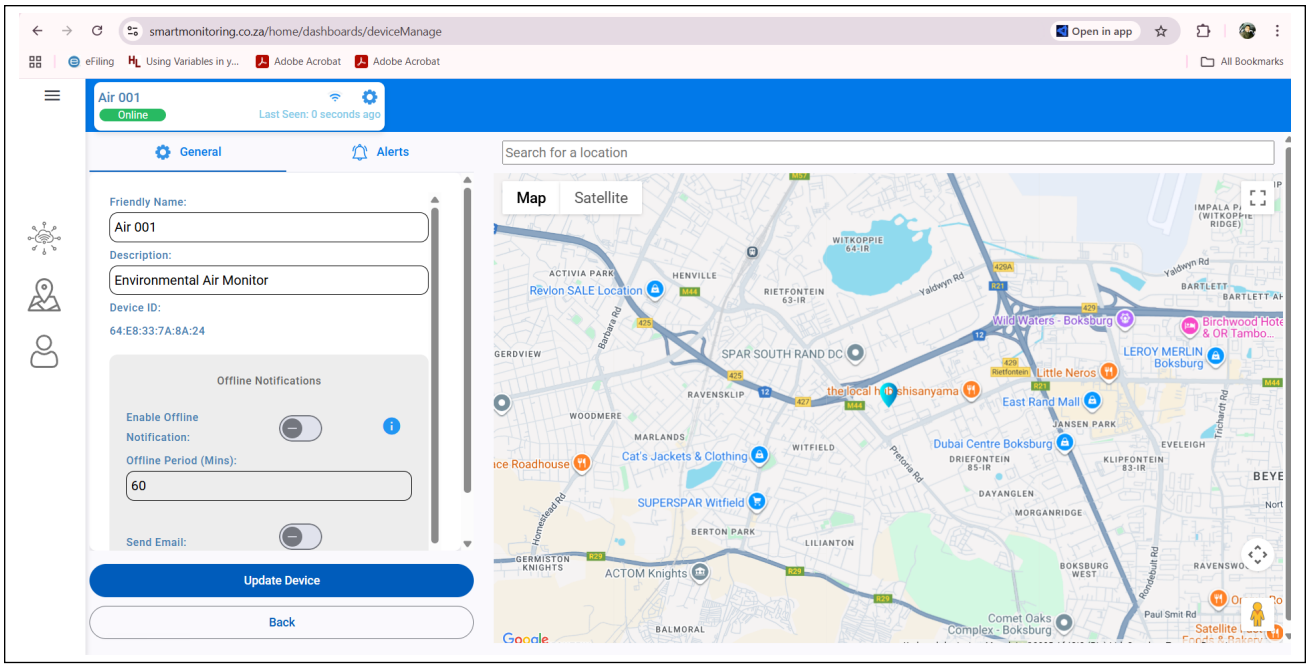
The user is also able to set alerts of the various fields, Alert Screen shots as shown below.





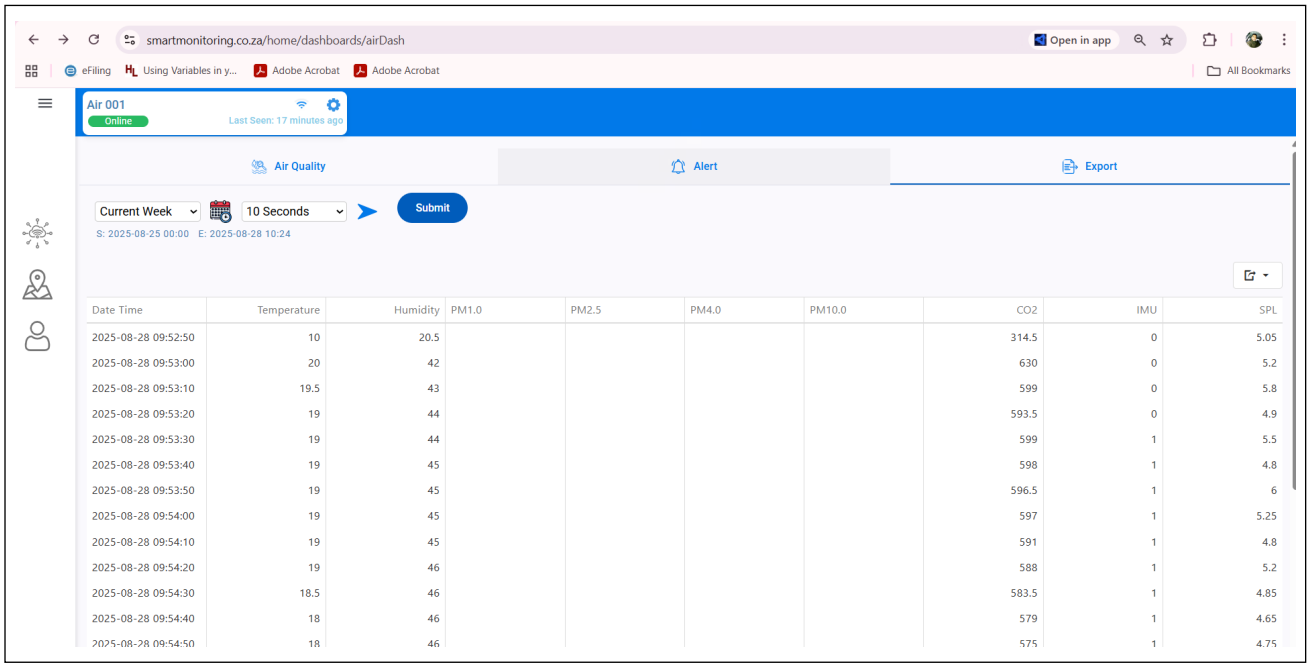


The user is also able to set their location which is shown on the Map Below:



Back to TOC

Save values can be exported from the Smart Monitoring Database to Excel (CSV format) at selectable intervals set in the Webserver, this is shown below.

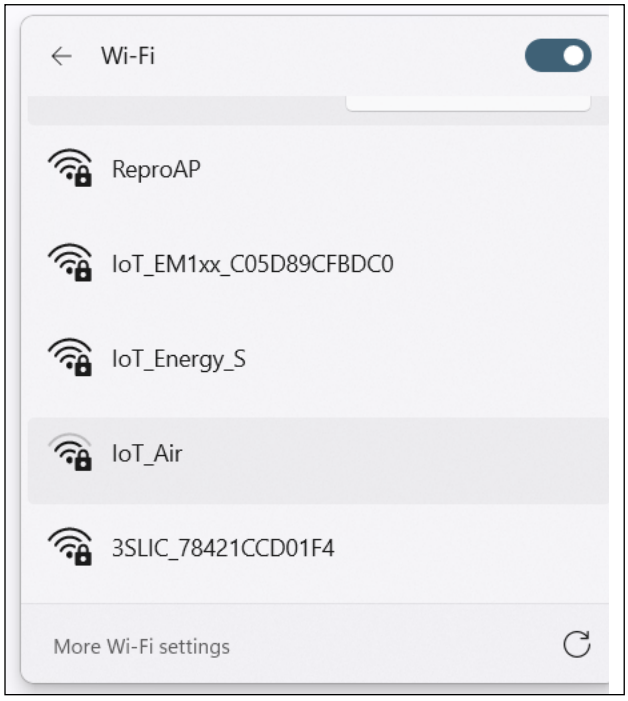


Date Time	Temperature	Humidity	PM1.0	PM2.5	PM4.0	PM10.0	CO2	IMU	SPL
2025-08-28 09:52:50	10	20.5					314.5	0	5.05
2025-08-28 09:53:00	20	42					630	0	5.2
2025-08-28 09:53:10	19.5	43					599	0	5.8
2025-08-28 09:53:20	19	44					593.5	0	4.9
2025-08-28 09:53:30	19	44					599	1	5.5
2025-08-28 09:53:40	19	45					598	1	4.8
2025-08-28 09:53:50	19	45					596.5	1	6
2025-08-28 09:54:00	19	45					597	1	5.25
2025-08-28 09:54:10	19	45					591	1	4.8
2025-08-28 09:54:20	19	46					588	1	5.2
2025-08-28 09:54:30	18.5	46					583.5	1	4.85
2025-08-28 09:54:40	18	46					579	1	4.65
2025-08-28 09:54:50	18	46					575	1	4.75

The user is also able to register for Alerts via WhatsApp and email.

13. SETTING UP THE WEBSERVER

The user needs to search for the AIR IOT's SSID are shown below.

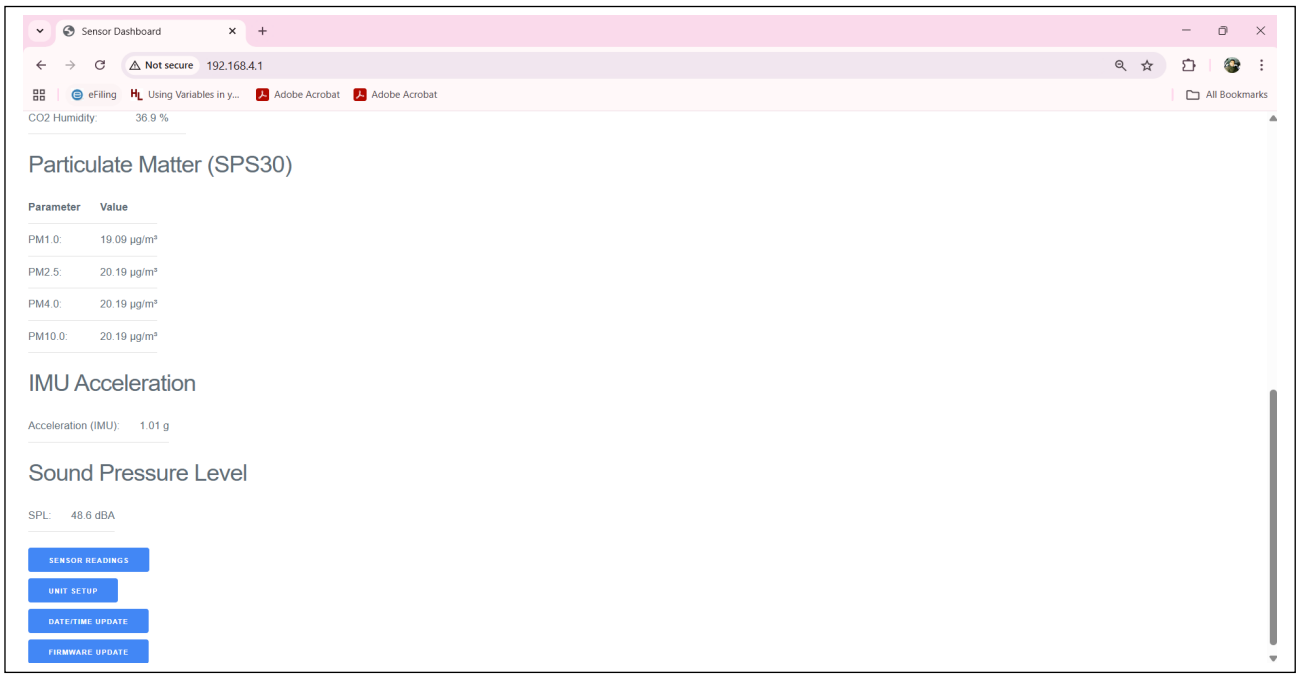


Once the user has “clicked” on the device to “pair” with it, the user needs to fill in the password of “repro123” to connect to the device.

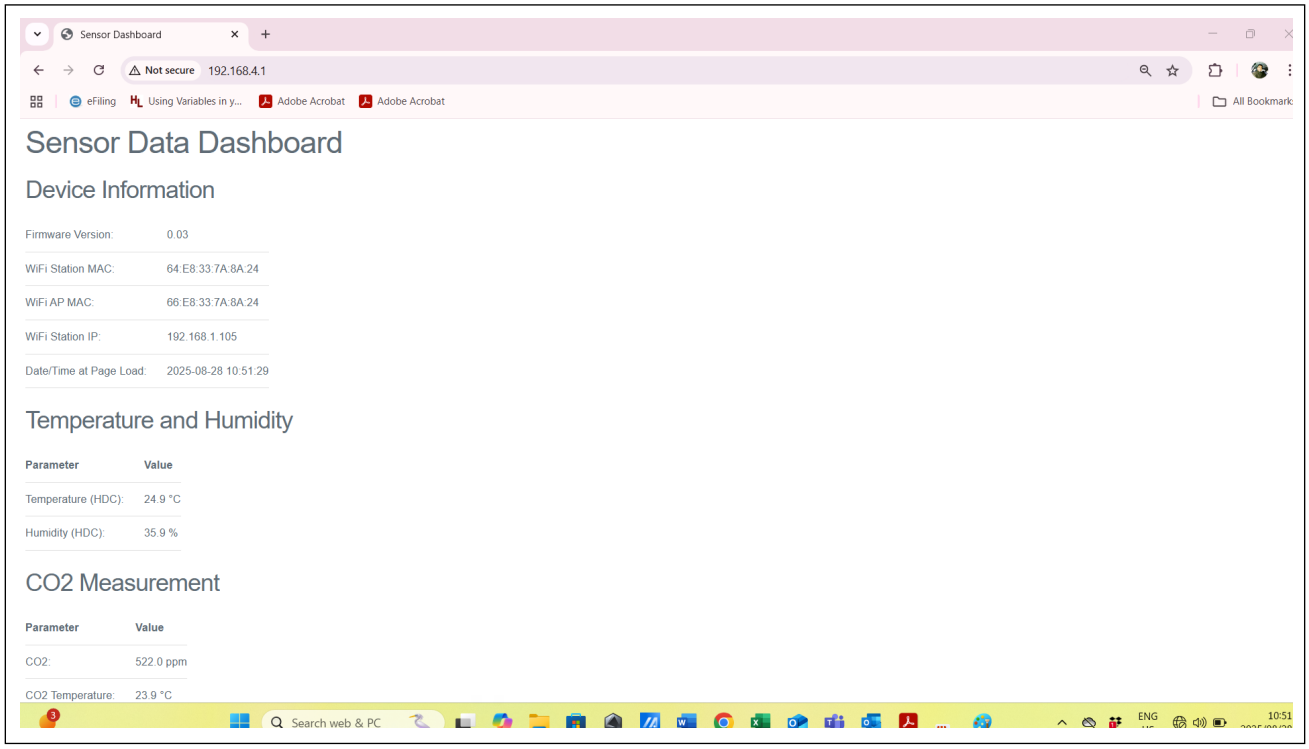
The user then needs to open a web browser and enter 192.168.4.1 in the URL’s address. This will bring up the index page as shown below.

The index page consists of the following tabs.

- Sensor Readings
- Unit Setup
- Date/Time Update
- Firmware Update



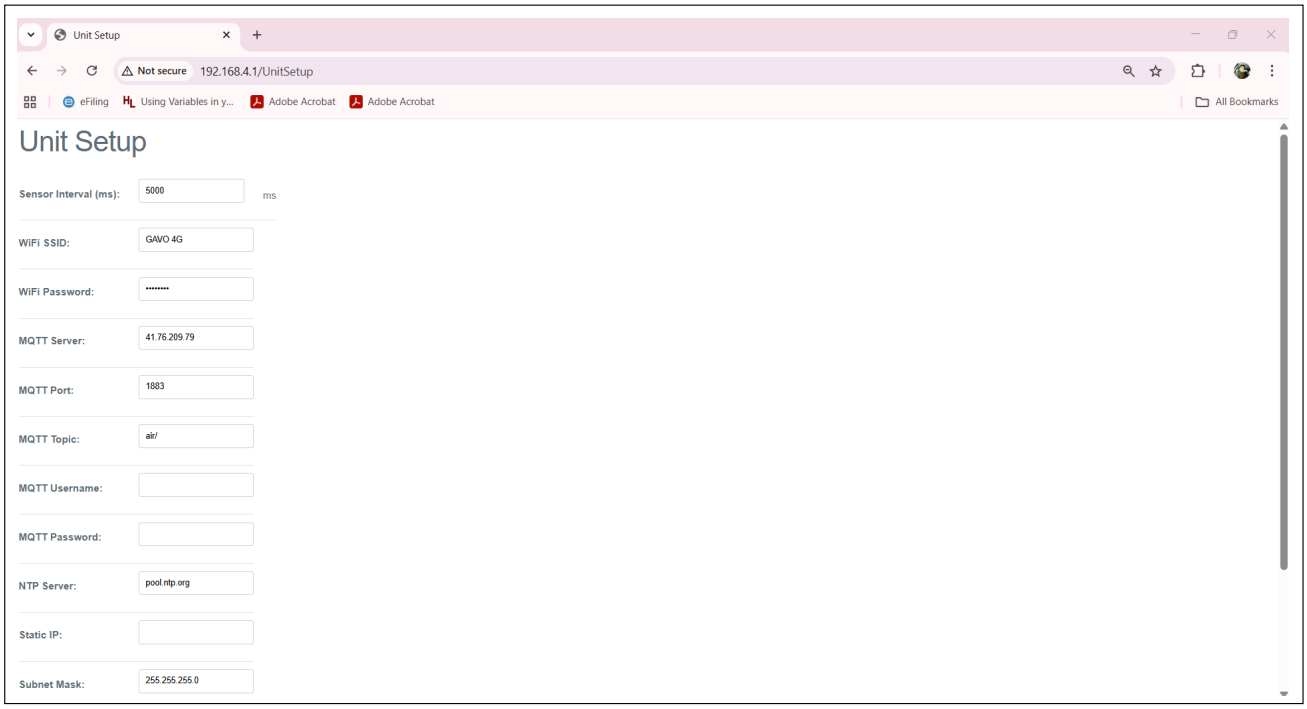
Once the User has clicked the ‘Sensor Reading” tab, all the Sensor information will be shown below from all sensors connected.



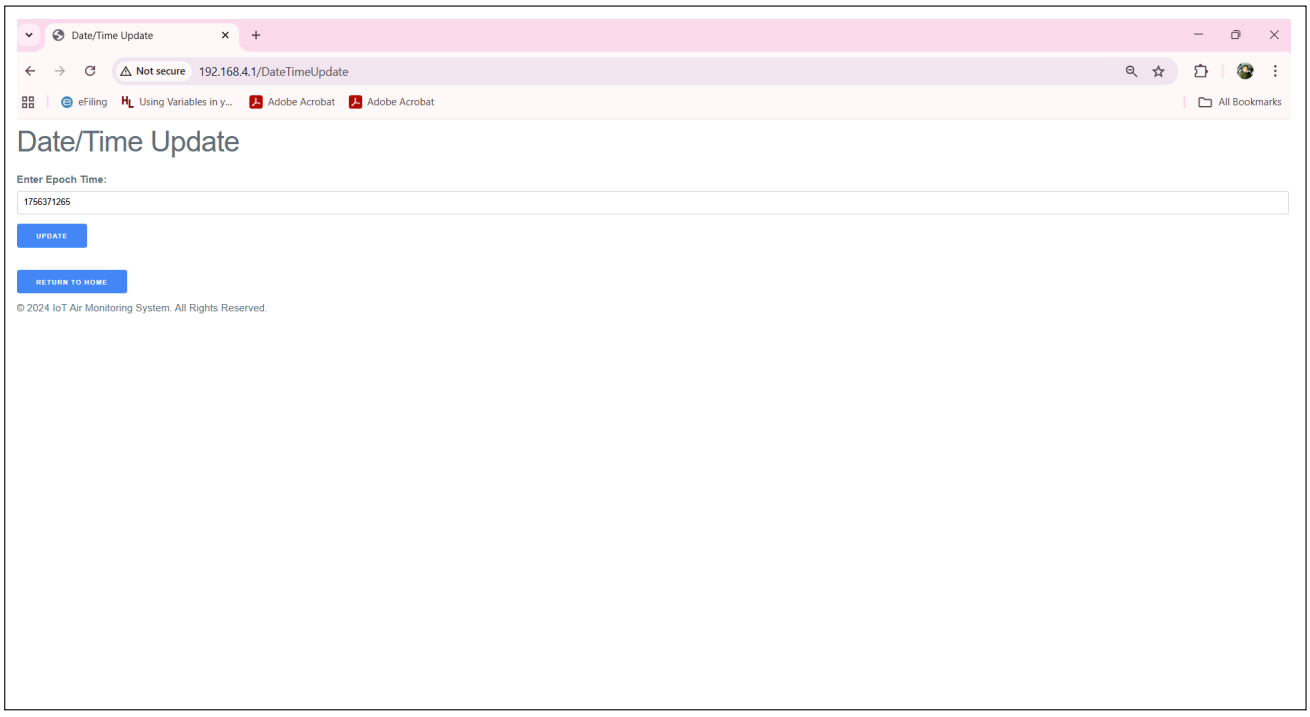
The Setup Tab is the where the user will enter their SSID and Password to connect to their Wi-Fi to enable the unit to push the data via MQTT to the Smart Monitoring servers.

The user can also use a different MQTT Server (from the default Smart Monitoring) and can enter a different IP Address for the MQTT Server, Username and password to connect to a different MQTT Broker and Server.

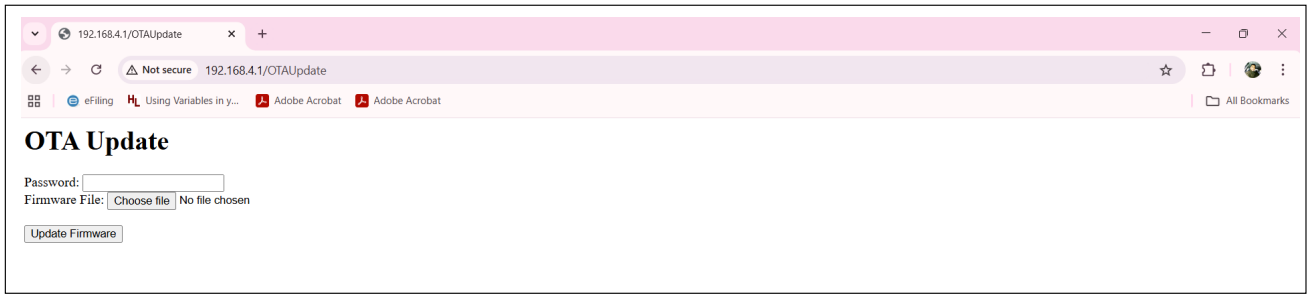
The user is also able to change the sampling rate from one second to 60-minute intervals. 60 seconds is the default value.



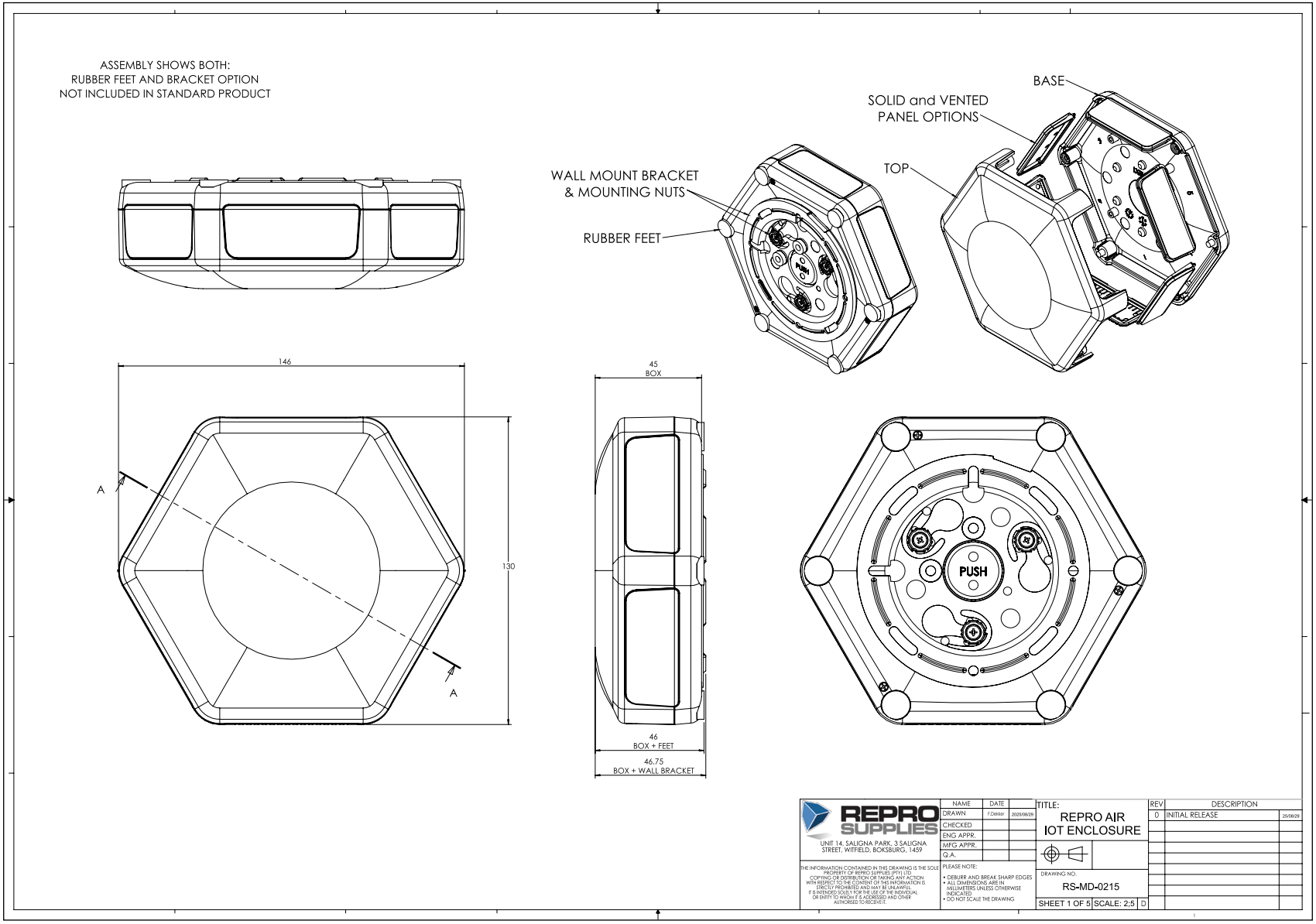
The Date/Time update tab is used to update the Date/Time, this is also automatically updated once the user has connected to Wi-Fi (internet) as this is automatically updated via the NTP Server.



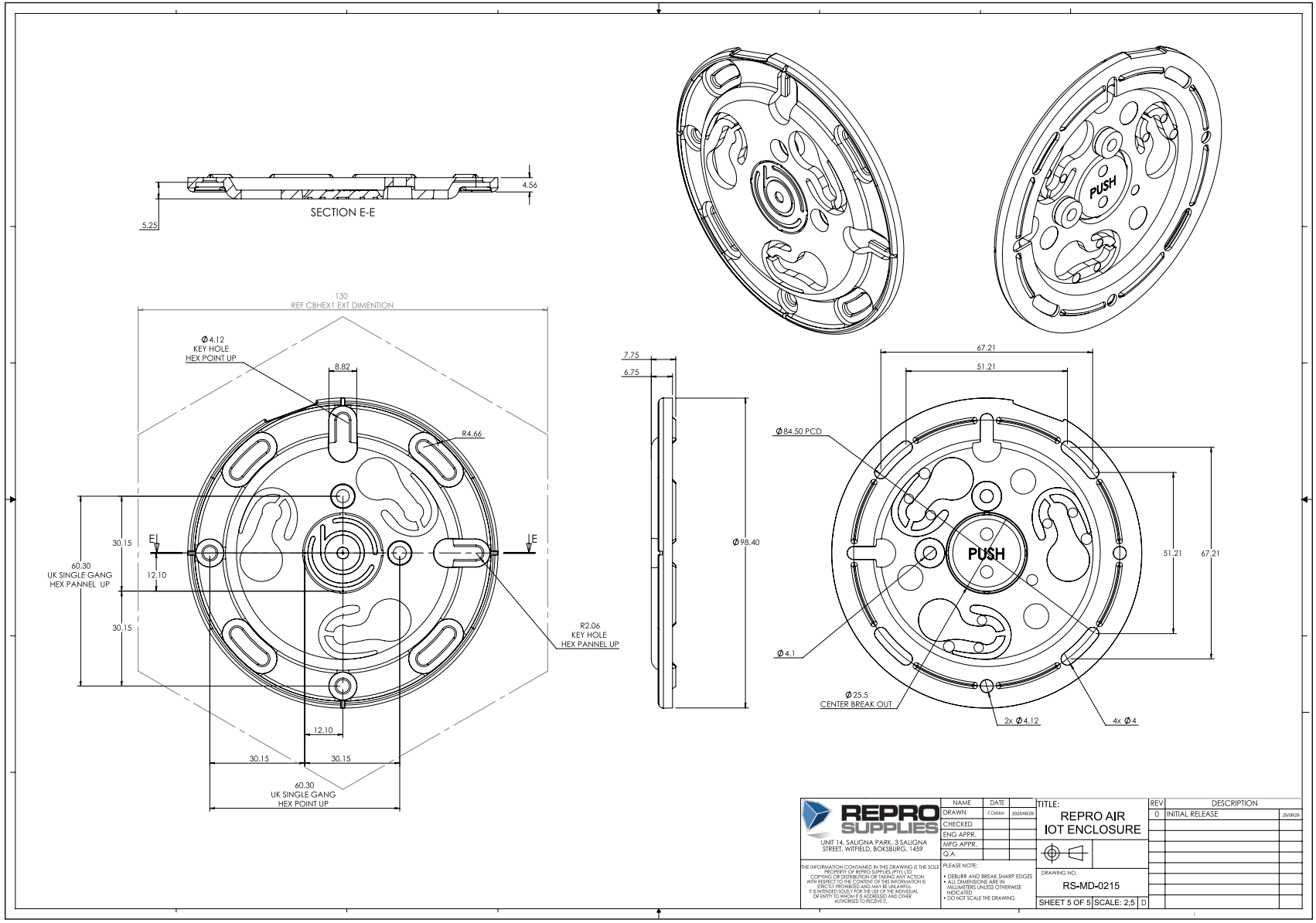
Firmware updates are done via the Firmware Update Tab whereby a “bin” file is automatically uploaded. This is password protected, the password of “9326” is entered to update the bin file.



14. MECHANICAL DRAWINGS



Back to TOC


SECTION E-E
4.56
5.25
PUSH
130
REF CBHEX1 EXT DIMENTION
Ø4.12
KEY HOLE
HEX POINT UP
8.82
R4.66
30.15
12.10
30.15
60.30
UK SINGLE GANG
HEX PANNEL UP
R2.06
KEY HOLE
HEX PANNEL UP
12.10
30.15
30.15
60.30
UK SINGLE GANG
HEX POINT UP
7.75
6.75
Ø98.40
67.21
51.21
Ø84.50 PCD
PUSH
51.21
67.21
Ø4.1
Ø25.5
CENTER BREAK OUT
2x Ø4.12
4x Ø4
REPRO SUPPLIES
UNIT 14, SALIGNA PARK, 3 SALIGNA STREET, WITFIELD, BOKSBURG, 1459
NAME
DATE
DRAWN
CHECKED
ENG APPR.
MFG APPR.
Q.A.
PLEASE NOTE:
• DEBURR AND BREAK SHARP EDGES
• ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED
• DO NOT SCALE THE DRAWING
TITLE:
REPRO AIR IOT ENCLOSURE
DRAWING NO.
RS-MD-0215
SHEET 5 OF 5
SCALE: 2:5
D
REV
DESCRIPTION
0
INITIAL RELEASE

Back to TOC