
# Odalog G20 Series

## User Manual

ODA59-0691 Rev E - August 2024

# Contents

# 1. Document Revisions

***Table I: Document Revision History***

| Revision | Date | Description |
|---|---|---|
| **A** | 10-06-2022 | Initial Release |
| **B** | 29-05-2023 | Update Information Table |
| **C** | 14-12-2023 | Update memory storage information |
| **D** | 15-01-2024 | Update label, error display and information, add version history |
| **E** | 13-08-2024 | Update document format, add G20N RTx, add details on contents |
| | | |

# 2. Safety Precaution

## 2.1. FCC

This device complies with Part 15 of the FCC Rules and with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference; and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/ récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique 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;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

**WARNING:** Any changes or modifications not expressively approved by the grantee could voidthe user's authority to operate this equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

## 2.2. EMC

ICES-003 statement: Class A CAN ICES-003 (A) /NMB-003 (A).

This equipment complies with the FCC and ISED Canada radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and all persons during normal operation.

## 2.3. Alert Signals

As the user of the product, it is your responsibility to understand the proper function and operational characteristics of the loggers. This user manual should be thoroughly read, and all operators should be given adequate training before attempting to place the loggers in service.

Awareness of the stated cautions and warnings and compliance with recommended operating parameters, together with maintenance requirements, is important for safe and satisfactory operation. The unit should be used for its intended application; alterations or modifications will void the warranty.

### 2.3.1. Odalog® G20/ G20N

Do not use solvents to clean the Odalog gas logger (a damp cloth will suffice).

Do not insert objects (including fingers) into the gasinlet, as the filter may be damaged.

Do not attempt to disassemble sensors as they are potentially corrosive.

Before each day's use, sensitivity must be tested on a known concentration of test gas (to match the sensor type) equivalent to 20-50 percent of full-scale concentration. Accuracy must be within 5% of full scale. Accuracy may be corrected by calibration as described in the "Calibration" section.

The Odalog gas logger is not designed to operate as a safety device. When entering confined spaces and toxic hazard environments, all appropriate regulations and occupational health and safety precautions should be strictly adhered to. If unsure of potential hazards or safety standards, seek advice from your workplace occupational health and safety department or government regulatory body.

The ambient temperature range that the apparatusis suitable for is -20 °C to +50 °C.

"EX" CERTIFICATION is valid only to 21% VOL oxygen. The Odalog gas logger should not be used in oxygen-enriched atmospheres.

The battery shall not be removed or replaced by the user for any maintenance. Contact manufacturer/ authorized distributor.

Only touch the instrument with an insulating object.

To avoid build-up of electrostatic charge, the instrument shall be installed in a fixed location where it will be protected from inadvertent rubbing or strong flow of air and dust. It shall only be cleaned or wiped with a damp cloth.

Only use the micro-SD card that is provided or recommended by the manufacturer.

The enclosure shall only be disassembled in the non-hazardous area.

The JTAG is not meant for use by the user.

The USB parameters have been limited to 3.3 V. This shall be derived from a SELV or PELV system.

The following parameters shall be taken into account during interconnection in a system. Odalog G20 Entity Parameters at Connector CN6:

- Uo 3.9 V
- Io 275 mA
- Lo 55.77 µH
- Co 22 µF
- Ui 3.7 V
- Ii 225 mA
- Pi 206 mW
- Ci 181µF
- Li 20.2 µH

The maximum external capacitance and maximum external inductance of the circuits connected at CN6 have been additionally assessed for spark ignition compliance with resistive current limiting circuits at elevated voltages and currents and found to be compliant as follows:

- U 7.6 V
- I 480 mA
- Co 203 µF
- Lo 75.9 µH

## 2.3.2. Odalog® G20N RTx

This instrument transmits radio frequencies (2G/3G/Wi-Fi*), ensure all safety precautions are observed (depending on model). A separation distance of at least 20 cm must be maintained between the modem transmitter's antenna and the body of the user or nearby persons.

Disable communications when instrument is being transported via airplane.

LITHIUM BATTERY SAFETY:

a. This instrument uses lithium battery. All safety and handling precautions must be observed (lithium contained = approx. 3.9 grams per D-size high current battery). If dangerous good transport applies in your locality, remove the battery for transport if dangerous. (goods suitable for shipping methods are not available).
b. Avoid moisture contact with lithium batteries, may cause damage/explosion.
c. Do not attempt to disassemble instrument that shows signs of battery damage inside instrument.
d. Observe battery manufacturer's guidance on disposal.
e. Battery handling/shipping, safety and disposal information is available from manufacture or contact distributor for information.

This instrument is not 'intrinsically safe' and should not be used in potentially flammable or oxygen enriched atmospheres.

Do not use solvents to clean the instrument. (a damp cloth will suffice).

The apparatus is suitable for ambient temperature range of -20° C to +50° C.

Install and secure wiring (and excess wiring) attached to this instrument in accordance with workplace health and safety regulations of the installation site.

It is recommended that the instrument be installed out of direct sunlight (sheltered).

Service and/or repair work on this instrument must only be carried out by authorized service technicians. Return the instrument to an authorized service agent/distributor for any internal maintenance (other than changing the SD card and SIM card).

If using a custom external antenna, ensure manufactures safety precautions are adhered to.

Long-term exposure to temperature or humidity levels outside the instrument range may result in damage to the sensor and inaccurate data.

The Odalog gas logger is not designed to operate as a safety device and should not be used for confined space entry or hazardous area monitoring.

Do not insert objects (including finger) into gas inlet as the filter may be damaged.

Do not attempt to disassemble sensors as they are potentially corrosive.

Before each deployment, sensitivity must be tested on a known concentration of test gas (to match the sensor type) equivalent to 20-50 percent of full-scale concentration. Accuracy must be within
±10% of actual concentration or ±5% of full scale. Accuracy may be corrected by calibration (refer to user manual for calibration). It is recommended that a gas check be performed after deployment as well, so that accuracy of logged data can be checked (and corrected, if necessary, in the software).

The battery shall not be removed or replaced by user for any maintenance. Contact manufacturer authorized distributor.

Only touch the instrument with an insulating object.

To avoid build-up of electrostatic charge, the instrument shall be installed in a fixed location where it will be protected from inadvertent rubbing or strong flow of air and dust. It shall only be cleaned or wiped with a damp cloth.

Only use the micro-SD card that is provided or recommended by the manufacturer.

The enclosure shall only be disassembled in the non-hazardous area.

The following parameters shall be taken into account during interconnection in a system. Odalog G20N RTx Entity Parameters at connector CN6:

- Uo 3.9 V
- Io 275 mA
- Lo 55.77 µH
- Co 22 µF
- Ui 3.7 V
- Ii 225 mA
- Pi 206 mW
- Ci 181 µF
- Li 17 µH

The maximum external capacitance and maximum external inductance of the circuits connected at CN6 have been additionally assessed for spark ignition compliance with resistive current limiting circuits at elevated voltages and currents and found to be compliant as follows:

- U 7.6 V
- I 518 mA
- Co 203 µF
- Lo 73 µH

# 3. Your Odalog G20

## 3.1. The Models

The following Table II shows the available units covered in this user manual. The G20/ G20N/ G20N RTx Gas Loggers are portable gas monitoring devices capable of logging poisonous gases in the harshest environments.

***Table II: The model on G20 Series***

| Model | Range (ppm) | Part Number | Resolution (ppm) | Communication |
|---|---|---|---|---|
| **G20** | 200 | G20-H2S-200 | 0.1 | USB. MODBUS |
| **G20** | 2000 | G20-H2S-200 | 1 | USB. MODBUS |
| **G20 RTx** | 200 | G20-RTX-H2S-200 | 0.1 | USB. MODBUS |
| **G20 RTx** | 2000 | G20-RTX-H2S-200 | 1 | USB. MODBUS |
| **G20N** | 200 | G20N-H2S-200-x[1] | 0.1 | USB, Bluetooth, MODBUS |
| **G20N** | 2000 | G20N-H2S-2000-x | 1 | USB, Bluetooth, MODBUS |
| **G20N RTx** | 200 | G20N-RTX-H2S-200-x-yy[2] | 0.1 | USB, Bluetooth, MODBUS, 4G |
| **G20N RTx** | 2000 | G20N-RTX-H2S-2000-x-yy | 1 | USB, Bluetooth, MODBUS, 4G |

## 3.2. Unit Label

Figures 1, 2 and 3 show the labels for the Odalog G20 and OdaLog G20N indicates the compliance to ATEX and IECEx regulation, the compliance information is shown.


***Figure 1: Odalog G20***


***Figure 2: Odalog G20 RTx***


***Figure 3: Odalog G20N***

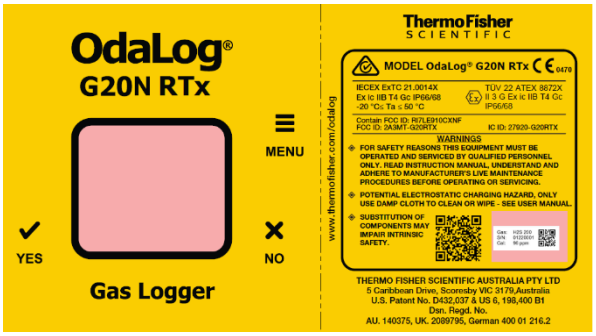


***Figure 4: Odalog G20N RTx***

[1] Determining the memory type, I (Internal) or E (External).

[2] Determining the modem region: AP (Asia Pacific), EU Europe), NA (North America)

# 3.3. Unpacking

At delivery, examine the exterior for physical damage while the carrier's representative is present. If exterior damage is present, carefully unpack and inspect the unit and all accessories for damage. If there is no exterior damage, unpack and inspect the equipment within five days of delivery.

If you find any damage, keep the packing materials and immediately report the damage to the carrier. Please do not return goods to the manufacturer without written authorization. When submitting a claim for shipping damage, request that the carrier inspect the shipping container and equipment.

## 3.3.1. Packing List

- 1x Odalog (G20/ G20N/ G20N RTx) unit
- 1x USB cable and 1x MODBUS cable
- 1x Grease (1 bottle)
- 1x Magnetic Hex Screwdriver
- 1x Calibration Adapter and 1-meter Flexible Hose
- 1x Standard Antenna (G20N RTx only

# 4. Introduction

The new Odalog G20 models are portable gas data loggers designed for application in harsh environments, such as the wastewater industry. This instrument is corrosion-resistant, durable, and reliable, with superior sealing and heavy-duty materials.

The new generation Odalog Logger picks up where its respected predecessor left off. A new type of sensor, extra memory, and communications options improve the user's experience and a longer deployment time.

## 4.1. Odalog G20/ G20N

Odalog G20/ G20N is a low power logger which, coupled with a long-life lithium cell power-source, has a battery life which exceeds 6 months in most cases.

The new Bluetooth communication enables the user to configure and download data from the Odalog unit. In addition, MODBUS communication allows the user to integrate into any SCADA.

The extra-large, easy to read LCD makes the Odalog simple to use and interpret instrument data and settings on-site.

The instrument main features can be viewed on-screen, such as: gas readings, temperature, humidity, percentage memory usage, logging mode, DUE EOL, DUE CAL, and time intervals, as well as a battery level indicator.

Odalog also interfaces with an easy-to-use software package, **OdaStat NX**, that brings logged data into the office environment in a user-friendly format.

In this manual we refer these two models (G20/ G20N) as G20, there is a specific discussion about memory storage.

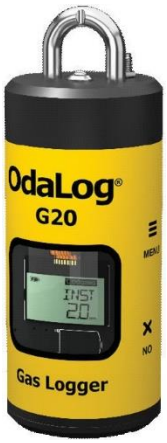


***Figure 5: Odalog G20***

## 4.2. Odalog G20N RTx

The new generation Odalog G20N RTx has a similar design to the Odalog G20, using all its features plus a new wireless data transmission and extended battery life. With low power consumption coupled with a Lithium D-cell power source, battery life will exceed three months in most cases.

The new Bluetooth communication enables the user to configure and download data from the Odalog unit. In addition, MODBUS communication allows SCADA integration, and a 4G modem provides remote data transmission.

The extra-large, easy-to-read LCD makes the Odalog simple to use and interpret instrument data and settings on-site.

The instrument's main features can be viewed on-screen, such as gas readings, temperature, humidity, percentage memory usage, logging mode, DUE EOL, DUE CAL, and a battery level indicator.

The Odalog G20N RTx gas monitoring system utilizes a 4G modem to transmit gas concentration and other parameters data to a dedicated FTP or FTPS server at the selectable interval. The stored data is in the form of coded binary files which PC-based software **OdaStat NX** can access and decode into CSV files for further analysis.

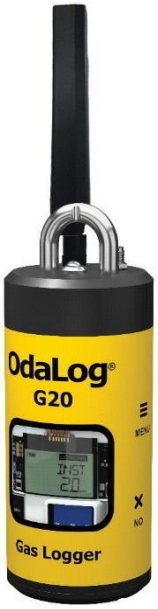


***Figure 6: Odalog G20 RTx***

# 4.3. General Specifications

Storage of the OdaLog® instrument, with sensors fitted should be limited to the temperature range of 0°C (32°F) to +25°C (75°F) and between 20% to 80% RH. The following table shows the product and sensor specifications and calibration requirements.

***Table III: Product Specifications***

| **Specification** | **Generic on All Models** | |
|---|---|---|
| Operating Temperature | -20°C (-4°F) to 50°C (122°F) | |
| Operating Humidity | 5% RH to 95% RH | |
| Dimension[3] | 76.5 mm (3.01") x 175 mm (6.89") | |
| Ingress of Protection | IP66/ 68 (1m / 2hr) | |
| Power supply | D Size lithium battery | |
| Data logging capacity | Greater than 10 million data points | |
| Logging interval | Selectable 5 minute (recommended minimum) to 1 hour | |
| **Specification** | **Odalog® G20/ G20N** | **Odalog® G20N RTx** |
| Battery Run Time[4] | Greater than 6 months | Greater than 3 months |
| Communication | USB, Bluetooth, MODBUS | USB, Bluetooth, MODBUS, Modem |
| Transmission Interval | N/A | 30 minutes to 24 hours |
| Antenna | N/A | IP68; 163 mm (6.41”) x 21.5 mm (0.85”)<br>698-960/ 1710-2710/ 2500-2700 MHz |
| Weight | 720 gr | 800 gr |

***Table IV: H2S Digital Sensor Specification***

| **Measurement** | **Values** |
|---|---|
| Operating Principle | Electrochemical |
| Accuracy | 5% of the measured value |
| T90[5] Response Time | <30 seconds |
| Output | ppm with temperature compensation |
| Warm-up Time | 20 seconds |
| Overload[6] | 1000 ppm |
| Recovery Time[7] | <180 seconds |
| Linearity | Linear (±5% from linear, up to 200 ppm) |
| Resolution | 0.1 ppm |
| Baseline offset[8] | <±0.5 ppm $H_2S$ equivalent |
| Equilibrium Baseline Shift (-40°C to +60°C) | <±3 ppm |
| Repeatability | ±5% of the measured value |
| Orientation Sensitivity | None |
| Communication | Serial |

***Table V: Calibration Gas and Flow Time***

| **Gas** | **Range (ppm)** | **Calibration Gas[9] (ppm)** | **Min Flow (ml/min)** | **Flow time (min)** |
|---|---|---|---|---|
| $H_2S$ | 200 | 30 – 100 | 250-500 | 15 |
| $H_2S$ | 2000 | 100 | 250-500 | 15 |

[3] Dimension without the antenna for Odalog® G20N RTx
[4] The expected operating time after installing a new battery
[5] Time required to reach 90% of target gas
[6] Maximum concentration that can be reached before damaging the sensor
[7] Time required to return near NULL after subjected to full range
[8] The offset for fresh air calibration
[9] Recommended calibration gas level

# 5. Quick Start Guide

Users will find within their new Odalog box as follows:

- 1x Odalog (G20/ G20N/ G20N RTx) unit
- 1x USB cable and 1x MODBUS cable
- 1x Grease (1 bottle)
- 1x Magnetic Hex Screwdriver
- 1x Calibration Adapter and 1-meter Flexible Hose
- 1x Standard Antenna (G20N RTx only)

The users should locate the **QR code** in the yellow label covering the Odalog unit. Please scan the QR code to download the manual and any supporting documents or software.

The following steps will assist users for the first time.

## 5.1. Pre – Deployment

### 5.1.1. OdaStat-NX installation

1. Download the OdaStat-NX software and install it on your PC, ensure to get the latest software version from our website.
2. Connect the USB cable if you wish to establish a wire connection to the PC or opt-in for the Bluetooth connection (standard Bluetooth ID is **ODA02**).

### 5.1.2. Switching ON

1. Turn the Odalog unit ON by positioning the magnetic screwdriver tip near the “Menu” marking on the yellow label; hold it there and wait until the display shows **ON2** – **ON1** – **ON**, then remove the magnet. The correct magnet position is at the lower “Menu” print.
2. The unit will enter the startup sequence, showing the current setting (factory setting), then it will end with INST on display.
3. The unit should start reading gas and show the value in the **INST** screen.

### 5.1.3. USB Connection

Users can find more information in the "OdaStat NX" section of the manual.

1. If you plan to use a USB cable, place the magnet tip near the **Menu** marking again; the menu will scroll at 2-second intervals.
2. Remove the magnetic tip when the display shows **UART**.
3. Connect the USB cable to the PC and run the **OdaStat-NX** software.
4. In the **OdaStat-NX**, change the connection setting to USB and click the **Connect** button.
5. The COM will appear automatically, and clicking the other Connect button will show a successful connection pop-up, followed by the **Login** window.
6. Use the default **Admin** for both username and password to gain access to the unit.

### 5.1.4. Bluetooth Connection

Users can find more information in the **OdaStat NX** section of the manual.

1. If you plan to use Bluetooth, the factory default ID is ODA02.
2. Place the magnetic tip near the **Menu** marking on the yellow label, hold it there until **BLE** appears, then remove the magnetic tip. You will see a blinking symbol on the Odalog display.
3. In the **OdaStat-NX**, change the connection setting to Bluetooth and click the **Connect** button.
4. The Bluetooth ID will appear in the left **Unpaired** list. Click the **Pair** button underneath the list, and the ID will move into the **Pair** list on the right.
5. Click the **Connect to device** button underneath the **Pair** list to establish the connection.
6. A successful connection pop-up will appear, followed by the **Login** window.
7. Use the default **Admin** for both username and password to gain access to the unit.

### 5.1.5. Configuration

1. Determine the sampling interval for the measurement (default is 10 minutes). Please note that a shorter interval will drain the battery faster.
2. You can select five parameters for logging. These are: $H_2S$, Temperature, Humidity, Battery Voltage, and Sensor Diagnostic. For G20N RTx modem signal strength is also available.
3. There are two choices for temperature units, Celsius and Fahrenheit.
4. The unit provides Due EOL[1] and Due Cal[2] information via MODBUS communication.
5. MODBUS: for G20/ G20N and G20N RTx using MODBUS, we recommend using a **StartAddress** and a **DeviceID** of 1 and a **baudrate** of 9600. Please note that for G20N RTx, MODBUS and 4G Modem are mutually exclusive; users can only make one selection.
6. For G20N RTx, using the 4G Modem, ensure the antenna installation has been completed and then, set up the 4G Modem and the Alarm triggers:

- The Modem Settings include the Access Point Name (**APN**), the FTP Server Setting and SMS information for the receipt of Alarms
- The Alarm Triggers allow users to set LOW, AVERAGE, and HIGH gas concentration threshold values, to trigger an email or SMS message.

**Note:** The Odalog software does not automatically activate the Modem. Please follow the next step to start the modem.

### 5.1.6. Enabling the Modem

1. The G20N RTx unit will not send data or SMS message after the initial configuration nor on first enabling logging; you must also enable the Modem on the unit.
2. Place the magnetic tip near the “Menu” marking on the yellow label, hold it there until “Transmit ON” appears, then remove the magnetic end.
3. G20N RTx will send a TEST SMS when enabling the modem for the first time and then send FTP data per the transmission interval. An SMS trigger will happen if gas level alarm is set in the configuration and a trigger threshold is reached.

## 5.2. Post – Deployment

### 5.2.1. Unit Retrieval

The new Odalog G20/ G20N unit can be deployed in the field for up to 3 months before needing to dry the sensor[10]. At this time, the unit may require battery replacement.

**Note:** When deployment time of G20/ G20N depends upon the site temperature/humidity and the sampling rate. Humidity affects the sensor, while the temperature and sampling time affects the battery consumption.

When retrieving the unit from the field, please ensure to carry out a decontamination process and clean the unit before doing any work.

### 5.2.2. Downloading the Data

Users can download the data directly from the unit using a USB cable or Bluetooth connection. It is also possible to retrieve the data from the FTP server via the **OdaStat-NX** application.

1. **DUE EOL** means the sensor end of life in days, When the value reaches 0 the sensor can no longer read the target gas.
2. **DUE CAL** is the sensor recalibration flag. When the value reaches 0 the sensor can no longer read the target gas.

Users can check the data download details in this manual within the **OdaStatNX** section.

### 5.2.3. Drying the Sensor

After retrieving the unit from the field, a drying process must commence to removing excess moisture from the sensor.

A rule of thumb, the drying time should equal the deployment time. For example, if the deployment time is 75 days, the drying time should use the same time frame in an air-conditioned room (humidity approx. 50%). Utilizing a special drying chamber (chamber humidity approx. 25%) can reduce the drying time by 30%.

[10] Electrochemical cells need a drying cycle in between deployment periods for removing the absorbed humidity.

# 6. Operation

## 6.1. Odalog Display

This section describes a brief operating procedure for the Odalog G20/ G20N and G20N RTx, covering the basics of all primary functionality. These functionalities are accessible from the screen menu; use a magnetic tipped screwdriver to make your selection.


***Figure 7: Unit's Label***

There are three locations for the magnetic switches: **Menu** and **No** on the right side of the screen, and **Yes** on the left side of the screen (see Figure 7).

### 6.1.1. LCD Layout

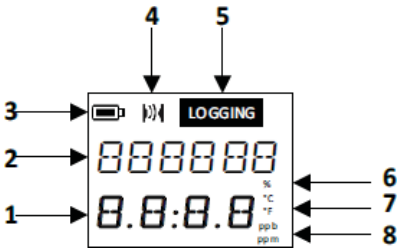


***Figure 8: 7-Segment Display***

Following are the parameters displayed on the LCD of the Odalog loggers (see Figure 8):

1. **Lower 7-segment characters**

   Displays gas readings and status values which are usually numerical digits, some supplemental menu headings and prompts.

2. **Upper 14-segment characters**

   Displays menu headings, prompts and other visual feedback, usually alphabetic characters and some numerical values displayed on screens.

3. **Battery Level Indicator**

   It displays the battery levels in 4 stages of depletion.

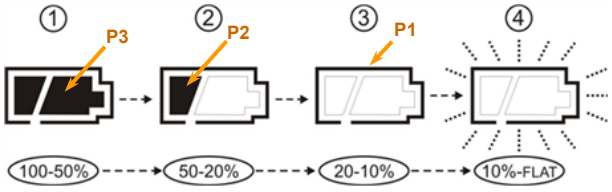


***Figure 9: Battery Depletion Stages***

   P1, P2, and P3 are the segments to display the battery percentage, as shown in Figure 9. The battery percentage display appears on all screens.

   - Stage 1 have all segments lit, it allows the logging and communication.
   - Stage 2 have P1 and P2 lit, it allows the logging and USB communication; the Bluetooth may become inactive after some time.
   - Stage 3 have P1 lit, it allows the logging but no communication.
   - Stage 4 have a blinking P1, all functions inactive, user may see some error messages.

4. **Communications Symbol**

   This symbol indicates if the instrument is enabled, or successfully connected, or transferring data.

   - On G20N RTx INST screen: The symbol may also indicate the approximate "signal strength" of the last transmission to the FTP server.

5. **Logging Symbol**

   This symbol flashing indicates that the instrument is Logging.

   **Note:** Flashing interval does not indicate logging interval.

6. **%** (Percentage)

   This symbol assists the humidity display at the end of the **STATUS** screen.

7. **°C/ °F** (Temperature units)

   These symbols indicate the temperature readings on the screen in degrees Centigrade or Fahrenheit, depending on the setting chosen in the **Odastat-NX** software package [Default = ºC].

8. **ppb/ppm** (Gas Reading units):

   These symbols indicate if gas readings shown are in "parts per million" or "parts per billion". ['ppb' is disabled in Odalog Logger G20, G20N, and G20N RTx series instruments].

### 6.1.2. Switching ON

Users need to use a magnetic tip screwdriver to switch the unit ON and hold the tip at the MENU until the screen shows an **ON3** counting down:

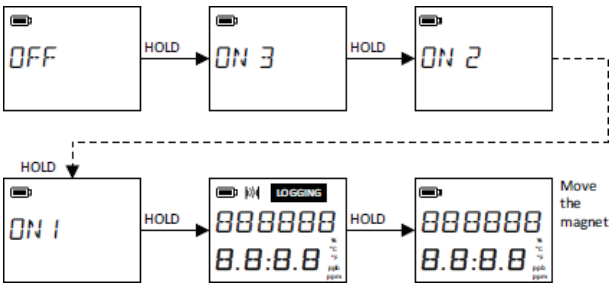


***Figure 10: Switching ON***

# 6.2. Odalog G20/ G20N

## 6.2.1. Main Menu

When the users hold the magnet at the MENU after switching ON the unit, a series of the menu will appear. Keep holding the magnet to scroll through the menu; remove the magnet to initiate the selection. The following Figure 11 shows the menu selection in the Odalog G20/ G20N.

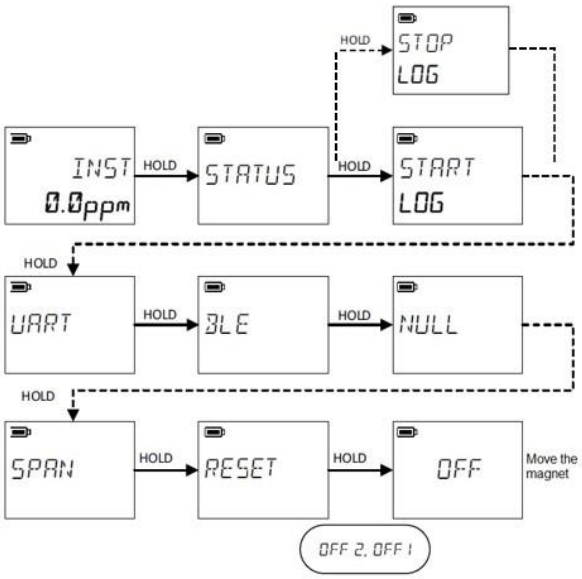


***Figure 11: Odalog G20/ G20N Menu Sequence***

#### 1. INST

This screen displays the instantaneous gas reading in ppm (parts per million) units.

#### 2. STATUS

Selection of this menu allows the user to see the current **Instrument Parameters** (see Figure 12) as follows:

- **SWVER**

  It indicates the current firmware version.
- **PEAK**

  It shows the maximum gas reading, it is available when logging is enabled
- **CLOCK**

  It shows the current unit time in 24 hours format. As the clock will reset after battery replacement, it is important to set the clock via **OdaStat-NX**.
- **TEMP**

  The current temperature reading in °C or °F depending on the unit selection during configuration through **OdaStat-NX**.
- **BATTERY**

  The remaining battery voltage expressed in V. The battery voltage does not have a direct relation to the remaining capacity of the battery.

  Users need to observe the battery display indicator or battery level from the data.
- **MEMORY**

  The size of free memory, expressed in Gigabyte.
- **SECOND**

  It shows the measurement intervals that is currently set in the unit, expressed in seconds (i.e.: 15 minutes = 900 seconds).
- **CALGAS**

  It indicates the last calibration gas level; if required, user can change the gas standard through the configuration in **OdaStat-NX** before the calibration.
- **DUEEOL**

  It indicates the remaining time until the end of the life of the sensor, expressed in days. Sensor replacement must be performed before the number reach 0 to avoid any missing data since the logger will stop at value 0.
- **DUECAL**

  It shows the remaining time for the next recalibration, expressed in days. Each calibration will reset the number to 255 days.
- **MODBUS**

  It indicates the status of MODBUS communication, 0=disable, 1=enable.
- **BPS**

  It shows the baud rate setting, it will appear only when the MODBUS status is 1.
- **HUMD**

  It shows the internal unit humidity reading, this figure does not represent the humidity at the installation site.

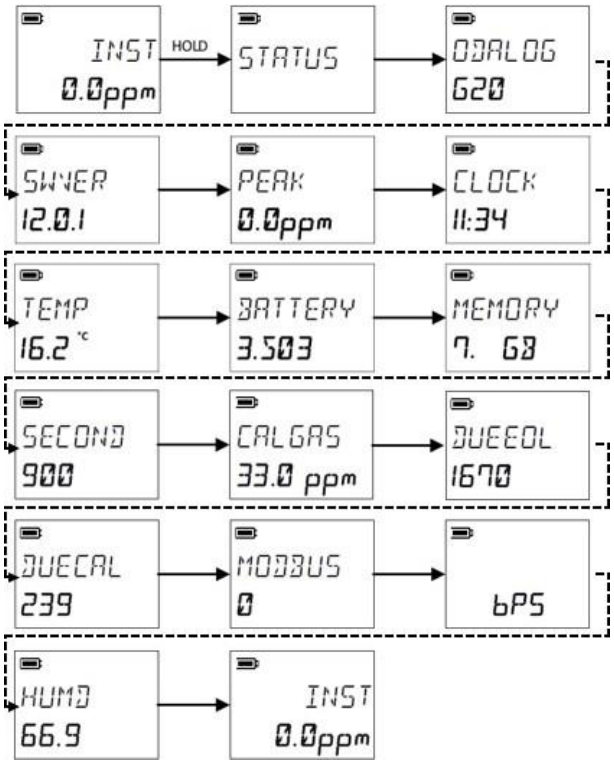


***Figure 12: The Status Screen of Odalog G20/ G20N***

### 3. START LOG

This screen enables logging of the data. The LOGGING symbol confirms the selection, flashing on the screen (see Figure 13).

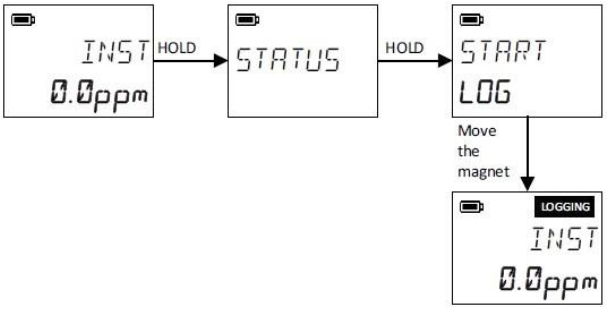


*Figure 13: Start Logging*

### 4. STOP LOG

When Odalog is logging data (**LOGGING** symbol is showing) use the below sequence to cease logging (see Figure 14).

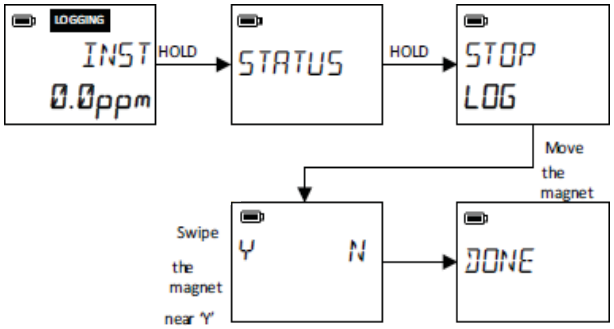


*Figure 14: Stop Logging*

### 5. UART

This screen selection enables a **UART** (Universal Asynchronous Receiver-Transmitter) link for communicating with the Odalog instrument. Users can utilize the USB cable to communicate with the unit.

**COMSTR** will appear if there was no active UART and **COMSTP** appears if UART is currently active. Users need to confirm the selection by swiping the magnet on the Y or N selection. Failure to confirm will result in cancellation (see Figure 15).

### 6. BLE

This screen selection enables or disables Bluetooth Low Energy (**BLE**) links for communicating with the Odalog instrument. For the first time, users can use a default ID of **ODA02**.

**COMSTR** will appear if there was no active Bluetooth and **COMSTP** appears if Bluetooth is currently active. Users need to confirm the selection by swiping the magnet on the Y or N selection. Failure to confirm will result in cancellation. Figure 16 shows a Bluetooth ID of **ODA01**.

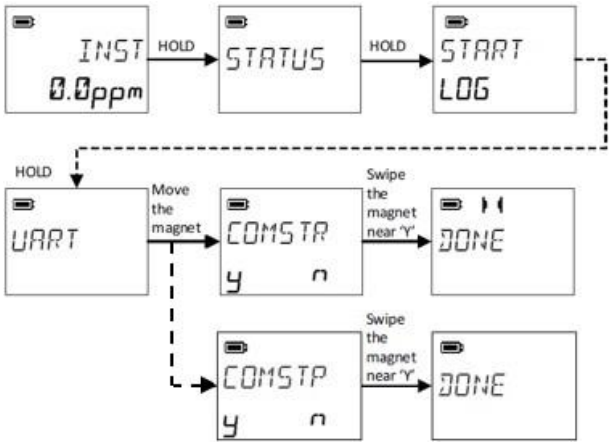


*Figure 15: UART Comms ON/ OFF*

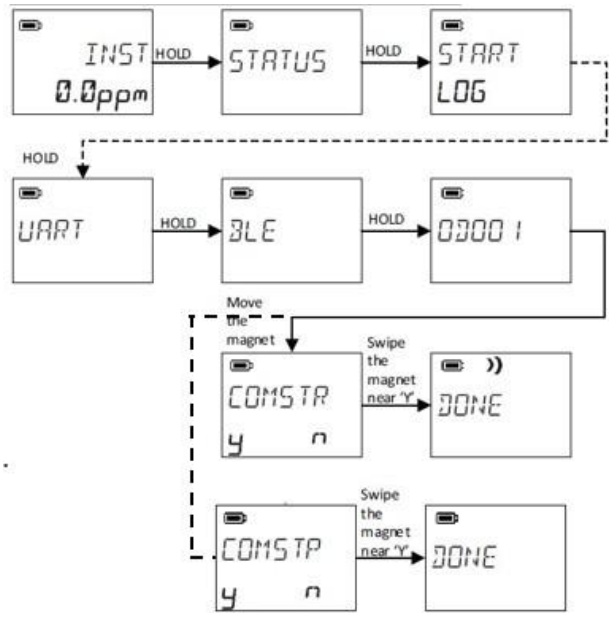


*Figure 16: Bluetooth Comms ON/ OFF*

### 7. NULL

This screen selection is used to start the calibration of the sensor against fresh air. This process is usually carried out prior to **SPAN** calibration. An extra confirmation requires the users to swipe a magnet on Y. Failure to confirm will result in cancellation (see Figure 17).

### 8. SPAN

This screen selection will start the calibration of the sensor in specific calibration gas. Please check the recommended calibration gas against the unit measurement range in Table V. An extra confirmation requires the users to swipe a magnet on Y. Failure to confirm will result in cancellation (see Figure 18).

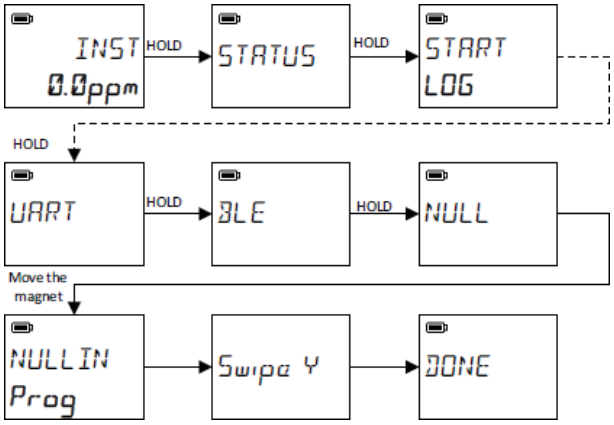


***Figure 17: NULL Calibration***

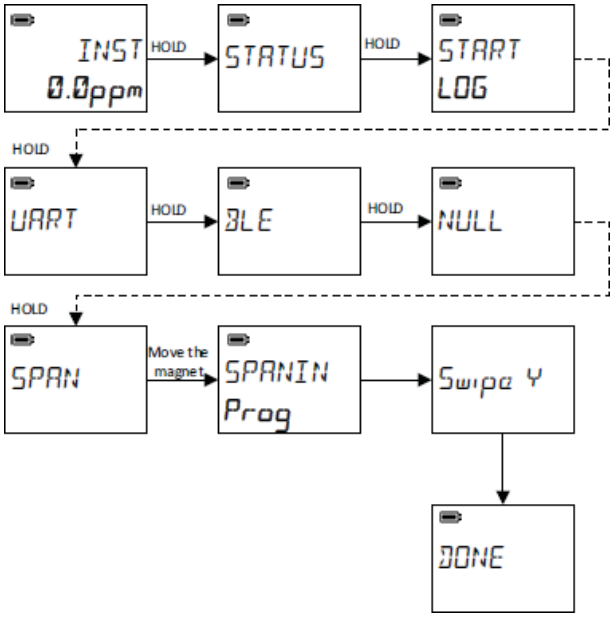


***Figure 18: SPAN Calibration***

#### 9. RESET

This screen selection is used to reset the unit after **NULL** and **SPAN** calibration or if one or more functions failed (i.e.: logging, SD Card Failed).

#### 10. OFF 2 – OFF 1 – OFF

This screen selection will turn the unit OFF. Users must keep the magnet close until the screen shows OFF, otherwise the screen will revert to INST.

## 6.2.2. Extra Menu

There are several functions that are accessible from the OFF screen. Users will need to keep holding the magnet at the MENU past the 7-segment display initialization stage (all segments in the display will light up). See Figure 19 for the detailed menu.

#### 1. UART

This screen enables a USB (Universal Asynchronous Receiver-Transmitter) link for communicating with the Odalog instrument. Users can utilize the USB cable to communicate with the unit.

#### 2. BLE

This screen selection enables Bluetooth Low Energy (BLE) links for communicating with the Odalog instrument. For the first time, users can use a default ID of **ODA02**.

#### 3. CLEAR LOG

This screen selection will delete all data files from memory. Users is advised to use this function with caution.

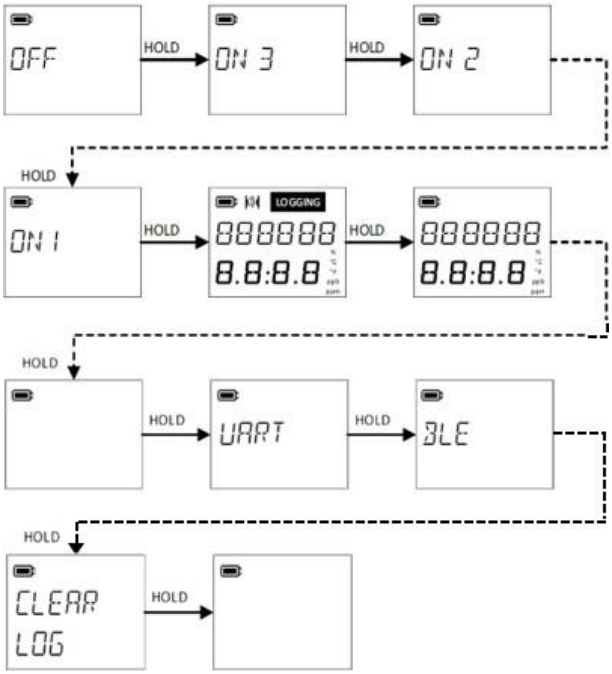


***Figure 19: Location of the Extra Menu***

# 6.3. Odalog G20N RTx

## 6.3.1. Main Menu

A series of menus will appear when the users hold the magnet at the MENU spot after switching ON the unit. The G20N RTx menu has one more function, which enables the modem (TRNSMT); the other functions are the same as the G20/ G20N unit. Figure 20 shows the menu selection in the Odalog G20N RTx.

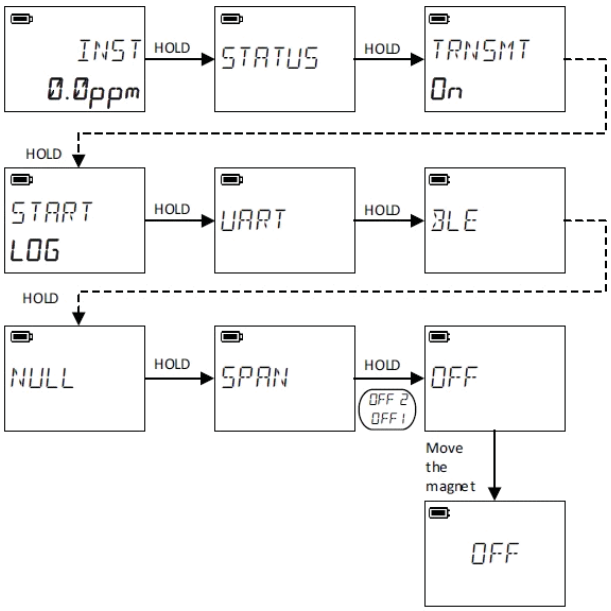


***Figure 20: Odalog G20N RTx Menu Sequence***

#### 1. INST

This screen displays the instantaneous gas reading in ppm (parts per million) units.

#### 2. STATUS

Selection of this menu allows the user to see the current **Instrument Parameters** (see Figure 21) as follows:

- **SWVER**

  It indicates the current firmware version.
- **PEAK**

  It shows the maximum gas reading, it available when logging is enabled
- **CLOCK**

  It shows the current unit time in 24 hours format. As the clock will reset after battery replacement, it is important to set the clock via **OdaStat-NX**.
- **TEMP**

  The current temperature reading in °C or °F depending on the unit selection during configuration through **OdaStat-NX**.
- **BATTERY**

  The remaining battery voltage expressed in V. The battery voltage does not have a direct relation to the remaining capacity of the battery. Users need to observe the battery display indicator or battery level from the data.
- **MEMORY**

  The size of free memory, expressed in Gigabyte.
- **SECOND**

  It shows the measurement intervals that is currently set in the unit, expressed in seconds (i.e.: 15 minutes = 900 seconds).
- **CALGAS**

  It indicates the last calibration gas level; if required, user can change the gas standard through the configuration in **OdaStat-NX** before the calibration.
- **DUEEOL**

  It indicates the remaining time until the end of the life of the sensor, expressed in days. Sensor replacement must be performed before the number reach 0 to avoid any missing data since the logger will stop at value 0.
- **DUECAL**

  It shows the remaining time for the next recalibration, expressed in days. Each calibration will reset the number to 255 days.
- **MODBUS**

  It indicates the status of MODBUS communication, 0=disable, 1=enable.
- **BPS**

  It shows the baud rate setting, it will appear only when the MODBUS status is 1.
- **ALARMA** (Alarm Average)

  This screen displays the high gas level alert from data averaged over a 12-hour rolling window.
- **ALARML** (Alarm Low)

  This screen displays the low gas level alert, reaching the lower peak value set in the software.
- **ALARMH** (Alarm High)

  This screen displays the high gas level alert, reaching the higher peak value set in the software.
- **SIGNAL**

  This screen displays the GSM signal strength of the last successful SMS or data transfer
- **TRNSMT**

  This screen displays the transmission interval set in the configuration (the interval of FTP transfer).
- **HUMD**

  It shows the internal unit humidity reading, this figure does not represent the humidity at the installation site.

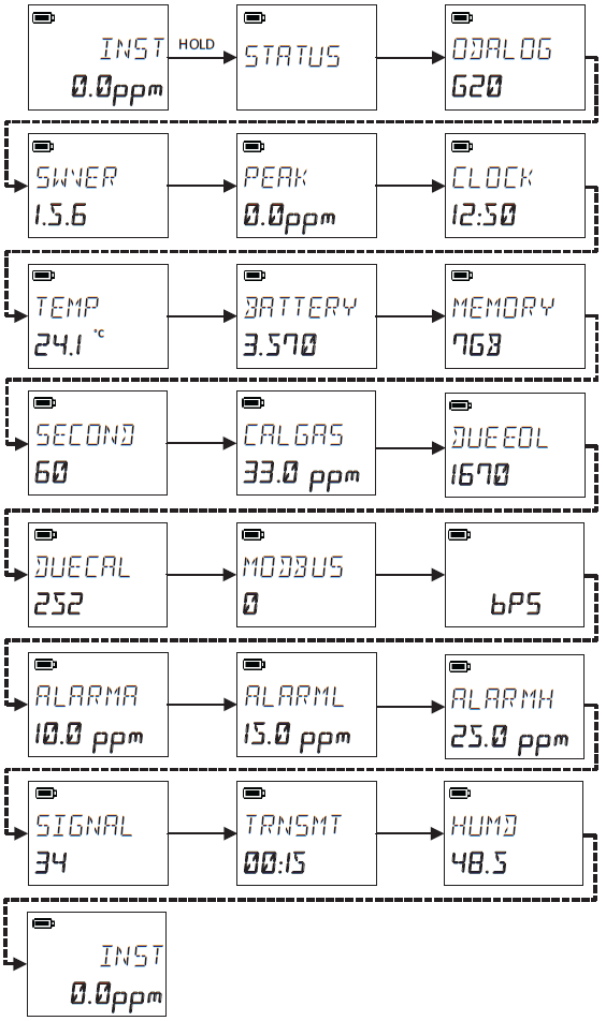


***Figure 21: The Status Screen of Odalog G20N RTx***

### 3. TRNSMT

This screen selection enables/ disables the transmission through the 4G modem. There are three sub-functions following this:

- **TRNSMT ON**

  It will enable the transmission; users will see this selection if there is no previous active transmission (see Figure 22).

- **TRNSMT OFF**

  It will disable the transmission; users will see this selection if it is active (see Figure 23).

- **TRNSMT LAST**

  It will repeat the last transmission; users will see this screen when there is no active transmission, and there was an attempt of data transfer previously (success or failed) (see Figure 24).

### 4. START LOG

This screen enables logging of the data. The LOGGING symbol confirms the selection, flashing on the screen (see Figure 13).

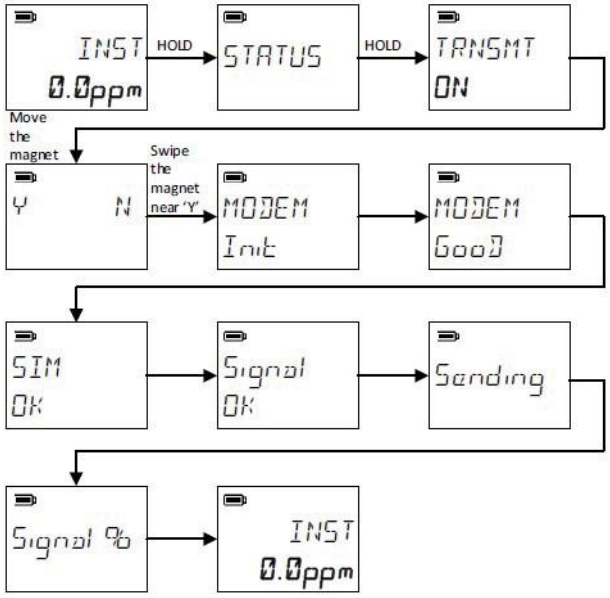


***Figure 22: Transmit ON***

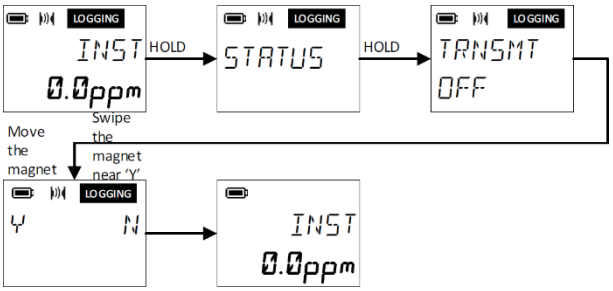


***Figure 23: Transmit OFF***

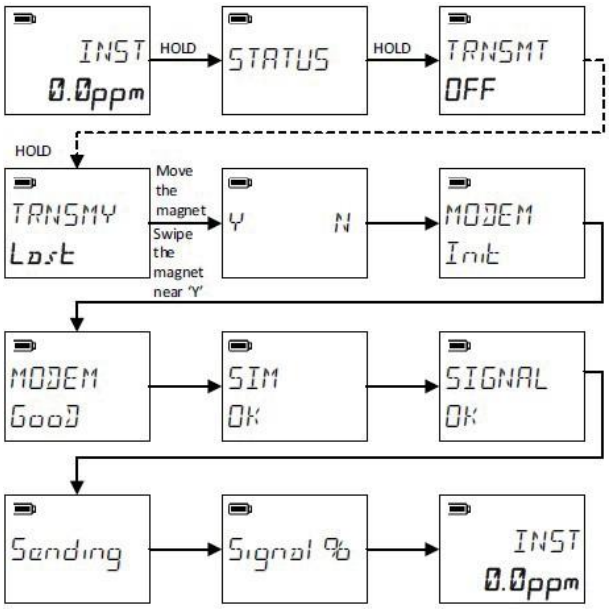


***Figure 24: Transmit LAST***

### 5. STOP LOG

When Odalog is logging data (**LOGGING** symbol is showing) use the below sequence to cease logging (see Figure 14).

### 6. UART

This screen selection enables a **UART** (Universal Asynchronous Receiver-Transmitter) link for communicating with the Odalog instrument. Users can utilize the USB cable to communicate with the unit.

**COMSTR** will appear if there was no active **UART** and **COMSTP** appears if **UART** is currently active. Users need to confirm the selection by swiping the magnet on the Y or N selection. Failure to confirm will result in cancellation (see Figure 15).

### 7. BLE

This screen selection enables or disables Bluetooth Low Energy (**BLE**) links for communicating with the Odalog instrument. For the first time, users can use a default ID of **ODA02**.

**COMSTR** will appear if there was no active Bluetooth and **COMSTP** appears if Bluetooth is currently active. Users need to confirm the selection by swiping the magnet on the Y or N selection. Failure to confirm will result in cancellation. Figure 16 shows a Bluetooth ID of **ODA01**.

### 8. NULL

This screen selection is used to start the calibration of the sensor against fresh air. This process is usually carried out prior to **SPAN** calibration. An extra confirmation requires the users to swipe a magnet on Y. Failure to confirm will result in cancellation (see Figure 17).

### 9. SPAN

This screen selection will start the calibration of the sensor in specific calibration gas. Please check the recommended calibration gas against the unit measurement range in Table V. An extra confirmation requires the users to swipe a magnet on Y. Failure to confirm will result in cancellation (see Figure 18).

### 10. RESET

This screen selection is used to reset the unit after **NULL** and **SPAN** calibration or if one or more functions failed (i.e.: logging, SD Card Failed).

### 11. OFF 2 – OFF 1 – OFF

This screen selection will turn the unit **OFF**. Users must keep the magnet close until the screen shows OFF, otherwise the screen will revert to INST.

## 6.3.2. Extra Menu

There are several functions that are accessible from the OFF screen. Users will need to keep holding the magnet at the MENU past the 7-segment display initialization stage (all segments in the display will light up). See Figure 19 for the detailed menu.

### 1. UART

This screen enables a USB (Universal Asynchronous Receiver-Transmitter) link for communicating with the Odalog instrument. Users can utilize the USB cable to communicate with the unit.

### 2. BLE

This screen selection enables Bluetooth Low Energy (**BLE**) links for communicating with the Odalog instrument. For the first time, users can use a default ID of **ODA02**.

### 3. CLEAR LOG

This screen selection will delete all data files from memory. Users is advised to use this function with caution.

**IMPORTANT NOTES:**

1. When enabling the transmission (**TRNSMT ON**), the logging will automatically activate. And disabling the transmission (**TRNSMT OFF**) will deactivate the logging.
2. The modem signal reading is available on a successful transfer activity either SMS or FTP transfer.
3. Upon enabling the transmission for the first time, the unit will send a Test SMS if the destination number is available (set up in the configuration).
4. SMS trigger is based on alarm setting (ALARMA, ALARML, ALARMH), while FTP trigger is based on the configuration setting.
5. The **TRNSMT** Mode should be turned off before calibration, as any transmissions to the server will cause any NULL or SPAN screens to be canceled.

# 7. Communications

USB and Bluetooth are the G20 series main communication features. MODBUS is available for connection to any existing system such as SCADA. The 4G modem is available only on G20N RTx.

## 7.1. USB (UART)

There is a special 1-meter USB cable which users can connect to the M8 connector on the unit's Top Cap. Upon a connection to a PC, it will trigger a USB driver installation.

Users should select UART mode per Figure 15and then establish a connection via **OdaStat-NX** (see Figure 28).

We recommend on using this USB connection for your choice of configuration, data download and firmware upgrade.

## 7.2. Bluetooth (BLE)

Bluetooth is the secondary choice of communication; however, the connection may not be possible if there is a strong Wi-Fi signal nearby.

Users should select **BLE** mode per Figure 16 and then establish a connection via **OdaStat-NX** (see Figure 32). The default ID is **ODA02**.

If required, users may enable Bluetooth function at periodic time on configuration setting (see Figure 36). For example, if the Bluetooth wake up interval is 1 hour, then every hour the unit will enable Bluetooth automatically for 30 seconds waiting for a connection. If a connection was established, it will stay on until disconnection. We recommend using a long wake up time to avoid draining battery.

## 7.3. MODBUS

The Odalog G20 series has a MODBUS connection suitable for integrating into a control/ monitoring system such as a dosing system. This integration will allow an automatic process in utilizing the $H_2S$ reading.

One of the cables supplied with your Odalog unit is a 4-wire MODBUS cable a connector to the G20 at one end and bare leads at the other. The users need to use a full duplex configuration when connecting to the host. Figure 25 shows the cable color guide.

### 7.3.1. Wiring Configuration

The standard MODBUS cable length is 1-meter; please use an extension wire to increase the connection length to the host controller. Please ensure proper termination. If the users plan to install the unit in a hazardous environment with an explosive atmosphere (containing a high concentration of $H_2S$), they must utilize an additional ATEX safety barrier module (see Figure 26).

This module will provide an extra safety between the ATEX area (site) and non ATEX area (enclosure/ control unit), preventing any possible current from travelling from non-ATEX area that can cause a spark.


***Figure 25: RS485 Wiring***

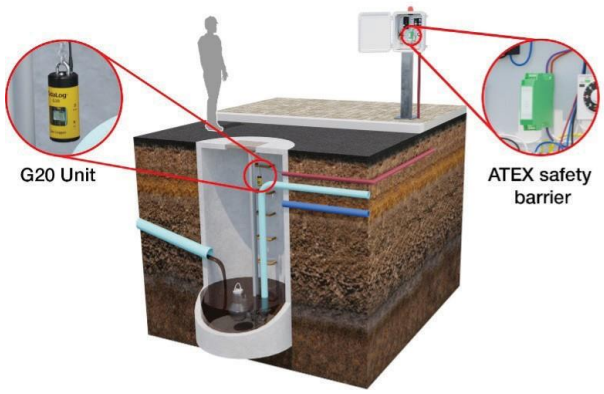


***Figure 26: ATEX Safety Barrier***

### 7.3.2. G20 MODBUS Setting

To enable MODBUS output, users must enable it in the G20 configuration. G20, G20N, and G20N RTx models both have MODBUS output; although specific to G20N RTx, users cannot use the internal modem while enabling the MODBUS output. In the **OdaStat-NX**, users must establish a connection before accessing **Instrument Parameters** to program the unit. Within **G20N RTx Communication Setup**, there are two communication options.

Users need to choose MODBUS to access its setting. Starting parameter address should start with 1; users can

choose any starting number. However, this number has shifted by 1 to the standard starting register for MODBUS. In the back-end process, if the user sets the starting address to 1, the MODBUS polling from the host PC/ controller/ PLC should use starting address 0.

- Address: 1 (recommended)
- Parameter address: 1 (recommended)
- Baud: 9600 (recommended)
- Port Setting: 8N1

The recommended baud rate is 9600; any higher baud rate may increase the timeout response from the host. If users want to use a higher baud rate, please ensure to trigger a retry when a timeout occurs.

The unit uses data bit 8 and stop bit 1, parity none, and flow control none.

The first three values ($H_2S$, Temperature, and Humidity) use a 2x 16-bit register in IEEE754 floating format; the rest occupies a 1x 16-bit register in UINT format and MODBUS function 3 (the Holding register). The values have the following sequence regardless of which parameters are enabled by the user:

The MODBUS reading has no relation to the enable logging selection since the memory will retain the last reading value. Users can poll the last measurement value independent of the logging time. However, the updated value will follow the logging time.

### 7.3.3. MODBUS Detailed Format

Assuming the sensor has the MODBUS slave address of 2, and the users want to extract all 10 values:

**Query (Host to Odalog)**

**09 04 00 00 00 0A 71 45 02 03 00 00 00 0A C5 FE**

- 09 represent the MODBUS slave ID
- 04 represent MODBUS function 4 (Input Register)
- 00 00 represents the data starting address (0)
- 00 0A represents the number of the requested register (10)
- 71 45 represents the CRC check

**Response (Odalog to Host)**

**09 04 14 00 00 00 00 F8 60 41 DD FF E0 42 88 0E 19 00 64 00 00 00 00 61 5B**

- 09 represent the MODBUS slave ID
- 04 represent MODBUS function 4 (Input Register)
- 14 represent the reading register count
- 00 00 00 00 represent $H_2S$ reading in reverse endian
- 00 00 00 (0 ppm)
- F8 60 41 DD represent Temperature in reverse endian **41 DD F8 60** (**27.74** °C)
- FF E0 42 88 represents Humidity in reverse endian **42 88 FF E0** (**68.50**%)
- 0E 19 represents Battery Voltage in mV 0E 19 (3609 mV)
- 00 64 represents Battery in percentage 00 64 (100%)
- 00 00 represents Due EOL in days 00 (0 days)
- 00 00 represent Due Cal in days 00 00 (0 days)
- 61 5B represents the CRC check

## 7.4. Modem (G20N RTx)

The modem in G20N RTx is a 4G variant with the capability to send SMS alarms and data to FTP or FTPS.

The FTP feature supports TLS 1.2 using the Advance Encryption Standard (AES) Sha-256. The unit will request an Explicit Mode from the server (requesting the server to create a secure session) on port 21 before transferring the data.

Please pay attention if there is a PIN on the SIM card. You can set the PIN number in the configuration or choose to disable it. To disable the SIM PIN, you will need to use an external device (i.e., a mobile phone).

### 7.4.1. FTP Transfer

The FTP transfer will follow the modem wake-up interval, which is set in the configuration. We recommend setting the wake-up interval daily (24 hours) to maximize the battery life and deployment time.

You will need to set the APN, which will give a data connection to the network.

Please check if the destination server is a common FTP server (FTP) or with a secured layer (FTPS). You may assign any port for the former but only port 21 for the latter.

You will need to have a folder ready on the server, which reflects the path in the configuration.

### 7.4.2. SMS Alarms

An SMS alarm will occur on the first enabling of communication, or when there is an alarm event, such as the reading reaching a certain limit set in the configuration, or if the sensor has an issue and needs attention.

Please ensure to address all the alarms, as failure to do that may cause an unexpected danger. You can have one up to three destination numbers for SMS.

There are several SMS variations depending on the unit status:

### 1. Test SMS

The TEST SMS will be sent to the registered number when the user enables the unit transmission for the first time. Here “for the first time” refers to the event when the user finished configuring the unit or after replacing the battery. The content of SMS as follows:

**45210021, SITE#Sewer1, BATT#100%, EOL#1664, CAL DUE#95, AVAMEM#7GB**

Explanation:

- 45210021 is the unit serial number
- Sewer1 is the site identification name
- 100% is the battery level percentage
- 1664 is the number of days before the sensor end of life
- 95 is the number of days before calibration is due
- 7 GB is the available memory size.

### 2. Low-Level Gas SMS

This SMS will be sent when the reading drops below the setting of the low gas threshold. The content of SMS as per example:

**45210021, SITE#Sewer1, PRESCONST#45, THRESHOLD#50**

Explanation:

- 45210021 is the unit serial number
- Sewer1 is the site identification name
- 45 is the current gas reading
- 50 is the low threshold level.

### 3. High-Level Gas Alert SMS

This SMS will be sent when the reading is above the setting of the high gas threshold. The content SMS as per example:

**45210021, SITE#Sewer1, PRESCONST#102, THRESHOLD#100**

Explanation:

- 45210021 is the unit serial number
- Sewer1 is the site identification name
- 102 is the current gas reading
- 100 is the high threshold level.

### 4. Alarm/ Alert Restored SMS

This occurs when the reading return to normal after experiencing either low or high gas threshold. The SMS content as follows:

**45210021, SITE#Sewer1, PRESCONST#36**

Explanation:

- 45210021 is the unit serial number
- Sewer1 is the site identification name
- 36 is the current gas reading.

### 5. Sensor Bad1 SMS

This occurs when the sensor runs out of electrolytes (drying out). The user will need to remove the unit from the site and keep the unit in a wet environment with humidity above 70% for a few days. If it does not work, replace the sensor. The example SMS as follows:

**45210021, SITE#Sewer1, Sensor Bad #1**

Explanation:

- 45210021 is the unit serial number
- Sewer1 is the site identification name
- Sensor Bad 1 is the current sensor status.

### 6. Sensor Bad2 SMS

This occurs when the sensor electrolyte is overflowing (too much water). The user will need to remove the unit from the site and keep the unit in a dry environment with humidity between 10-20% for a few days. If it does not work, replace the sensor. The example SMS as follows:

**45210021, SITE#Sewer1, Sensor Bad #2**

Explanation:

- 45210021 is the unit serial number
- Sewer1 is the site identification name
- Sensor Bad 2 is the current sensor status.

### 7. Low Battery Alarm SMS

This occurs when the battery falls below 50%.

**45210021, SITE#Sewer1, BATT#20%**

Explanation:

- 45210021 is the unit serial number
- Sewer1 is the site identification name
- 20% is the current battery percentage level.

### 8. Low Memory Alarm SMS

This occurs when the remaining free memory falls below 32 KB. The SMS example as follows:

**45210021, SITE#Sewer1, AVAMEM#32KB**

Explanation:

- 45210021 is the unit serial number
- Sewer1 is the site identification name
- 32 KB is the remaining memory capacity.

### 9. Sensor replacement due in 10 days Alarm SMS

This occurs when the due time for sensor replacement is within ten days. The SMS example as follows:

**45210021, SITE#Sewer1, REPLACE SENSOR WITH IN 10 DAYS**

Explanation:

- 45210021 is the unit serial number
- Sewer1 is the site identification name
- **Replace sensor within 10 days** is a 10-day warning for replacing the sensor.

### 10. Calibration due in 10 days Alarm SMS

This occurs when the scheduled time for sensor calibration is within ten days.

**45210021, SITE#Sewer1, CALIB SENSOR WITH IN 10 DAYS**

Explanation:

- 45210021 is the unit serial number
- Sewer1 is the site identification name
- **Calib sensor within 10 days** is a 10-day warning for calibration of the sensor.

# 8. OdaStat-NX

## 8.1. Home Screen


***Figure 27: OdaStat-NX User Interface***

Figure 27 shows the Home Screen of the OdaStat NX; users may access each software function directly. There are four main areas within the Home Screen:

- The Top Menu (1) provides access to the selected features; this menu is suitable for users familiar with the drop-down style.
- The Selector (2) allows users to choose the type of connection, either USB or Bluetooth.
- The Main Menu (3) has similarities to the previous OdaStat version, making it easier for the users to access the required function.
- The Action Page (4) is where the users provide input/ settings to the unit.

### 8.1.1. USB Connection

To establish a USB connection first select connection type USB, set the G20 unit into UART mode, and finally click the **Connect** (yellow button) (see Figure 28).

The Device Connection Setting will appear with automatic detection on the port number. Click the **Connect** (blue button) to establish a connection (see Figure 29).


***Figure 28: Communication Selection – USB***

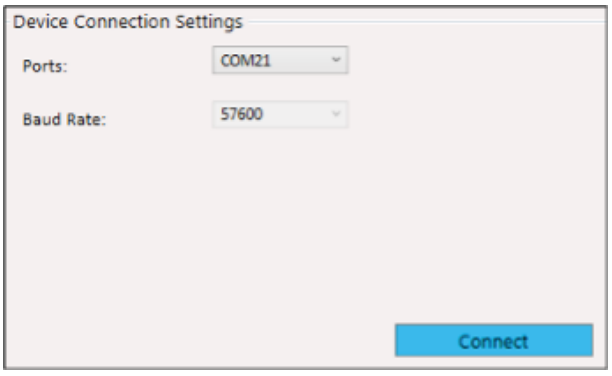


***Figure 29: USB Comms Interface***

A new window will pop-up to indicate a successful connection (see Figure 30), followed by a login page (see Figure 31).

Users can use **Admin** for both username and password for the first time.

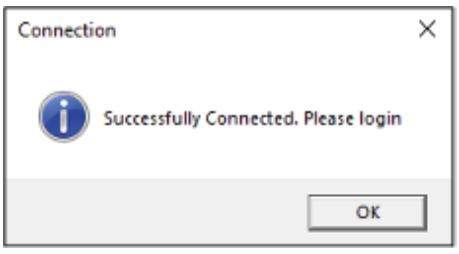


***Figure 30: Successful Connection Message***

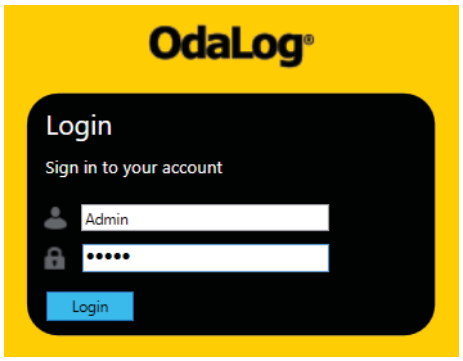


***Figure 31: LOGIN Interface***

## 8.1.2. Bluetooth Connection

There is no need to manually pair via your computer as the OdaStat-NX will do both pairing and unpairing.

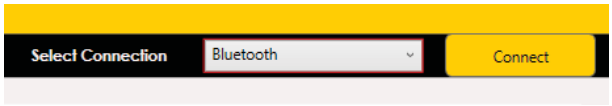


***Figure 32: Communication Selection - Bluetooth***

To establish a Bluetooth connection first select connection type Bluetooth (see Figure 32), then set the G20 unit into BLE mode, and click Connect (yellow button).

The **Bluetooth Device Management** window will appear with automatic detection on the Bluetooth name of the unit (default ODA02), which will appear within the **Unpaired devices** window (see Figure 33).

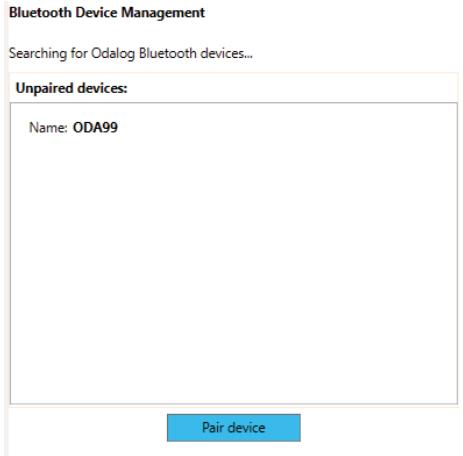


***Figure 33: Unpaired devices***

Users can click the unit Bluetooth name and then **Pair device** (blue button) to make a pairing to the PC. There is no need to have a pairing key as the OdaStat-NX will handle it internally. The Bluetooth name will move to the **Paired devices** window on the right.

To establish a connection, users need to click the unit Bluetooth name again and click the **Connect to device** button (see Figure 34).

Users can connect to more than one device as long as each device has a different Bluetooth ID1. After the established connection for the first time, the OdaStat-NX will keep the information next time.

Once a successful connection has been established, the Successful Connection Pop-up window will appear (see Figure 30) followed by the Login Page (see Figure 31).

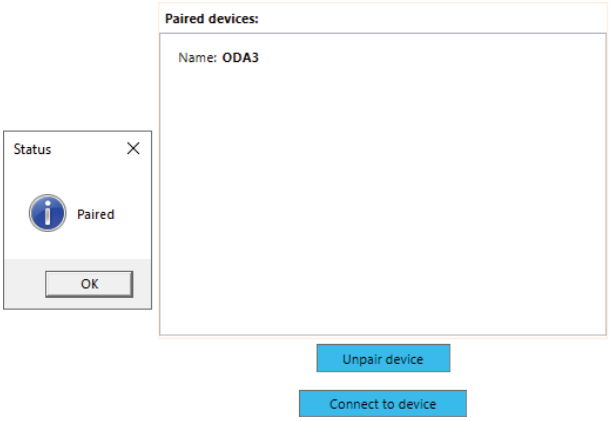


***Figure 34: Pairing Confirmation and Window***

# 8.2. Main Menu

The menu on the left of the Home Screen retains similarities with the previous OdaStat software. This includes the interface for setting up the Odalog unit, time setting, downloading, and displaying the data.

## 8.2.1. Set Date and Time

This menu allows users to see/adjust the current unit date and time of a connected Odalog. Users may set the unit time/date manually and click the **Set User Date Time** button.

The users may also use their computer as a reference by clicking the **Set unit to PC time** button (see Figure 35).

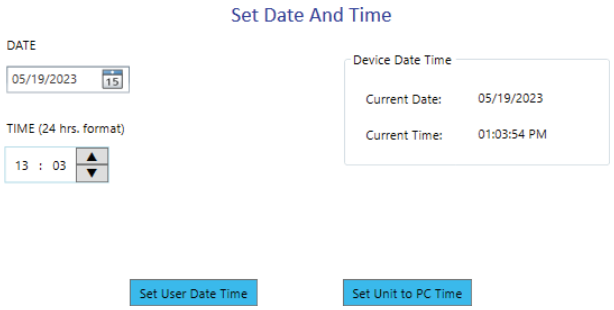


***Figure 35: Setting up Date and Time***

## 8.2.2. Instrument Parameters

One of the menus on the left of the Home Screen is the **Instrument Parameters** which allows the users to program the Odalog. There are three tabs on the **Instrument Parameters** screen: **Main**, **Manufacturing**, and **Modify User Detail** (see Figure 34).

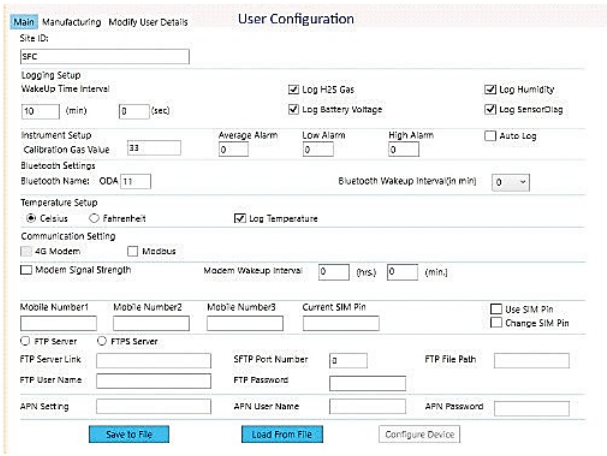


***Figure 36: Instrument Parameters Interface***

### 8.2.2.1. Main

The Main tab consists of all settings for the operation of the Odalog unit:

#### 1. Site ID

The site ID is used to identify the instrument and the deployment location. The default site ID is SFC which stands for Standard Factory Configuration.

#### 2. Logging Setup

The logging setup has two settings:

- **WakeUp Time Interval**

  This setting allows the user to set the logging interval (in minutes and seconds), the name implies that the unit will be in sleep mode if not reading the sensors.

  The default value is 10 minutes, with minimum effective interval at 5 minutes. We recommend on using an interval greater than 5 minutes. A logging interval at 1 second is possible for T90 purpose; thus, it can run only at a short time.

- **Parameters for logging**

  Users can check the boxes to enable logging at specific parameters ($H_2S$, Battery and Humidity).

**IMPORTANT NOTE:**

1. At this stage, there is no output for **SensorDiag** parameters into a file.
2. A shorter sampling interval will cause a shorter battery life.

#### 3. Instrument Setup

The instrument setup will allow the user to set the calibration gas level and alarm (alarm is only for G20N RTx).

- **Calibration Gas Value**

  User can change the value in this box (expressed in ppm) for preparation to the calibration.

- **Alarm Settings**

  These settings allow the users to set LOW, AVERAGE, and HIGH gas concentration threshold values (expressed in ppm). It will work in conjunction with SMS feature in G20N RTx.

- **Auto Log**

  This setting will enable logging right after sending the configuration to the unit and disconnect.

#### 4. Bluetooth Settings

- **Bluetooth Name**

  The first three characters have been predetermined to ODA; users may set the remaining two as numbers up to 99. The default factory setting is **ODA02**.

- **Bluetooth Wakeup Interval**

Set the time interval for the Bluetooth to wake up. Users may set it to 0 to disable automatic Bluetooth wake-up.

At this moment, this feature is temporary disable on G20. It will be enabled on both G20N and G20N RTx.

## 5. Temperature Setup

Users can select to log the unit temperature and can set the measurement unit, either Celsius or Fahrenheit.

## 6. Communication Setting

Select the communication type for the unit. The G20/ G20N unit allows MODBUS communication only; the 4G modem is not selectable. G20N RTx allows mutually exclusive 4G Modem or MODBUS communication.

### 6.1. MODBUS


***Figure 37: MODBUS Option Enabled***

When MODBUS is selected, the following functions are applicable per Figure 37:

- **Register Start Address**

  Users may define the start address; the register has a range between 1 – 32767. It used to assign the register starting address to the first parameter. Any external device can request the parameter by accessing the address.

- **Device ID**

  Users can set the Slave ID of the unit with a range 1 – 255. It is possible to link more than one Odalog devices to external SCADA system with the correct slave addressing.

- **Baud rate**

  Users must set the unit port speed, currently only 9,600 baud is available.

### 6.2. Modem

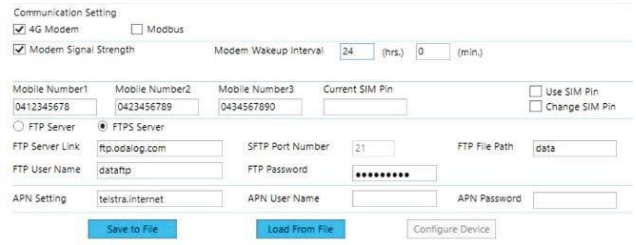


***Figure 38: Modem Option Enabled***

When modem is selected (G20N RTx), the following functions are applicable (see Figure 38):

- **Modem Signal Strength**

  This option enables users to log the signal strength.

- **Modem Wakeup Interval**

  This setting allows the data transmission interval.

- **Mobile Numbers**

  There are three destination numbers available for SMS alarms.

- **Current SIM PIN**

  Users can set the SIM PIN using this option in conjunction with the **Use SIM PIN** option.

- **Change SIM PIN**

  Users can change the SIM PIN utilizing this option; an additional **New SIM PIN** window will appear next to the **Current SIM PIN**.

- **FTP/ FTPS Server**

  Users can use this setting to set the type of FTP server destination; the selection also relates to FTP Server Link, FTP Username, FTP Password, and FTP Port.

- **APN Setting**

  Users can set the Access Point Name (APN) to gain data connection from the SIM card and check the appropriate APN from the service provider. Some private APNs may need to use APN Username and APN Password.

## 7. Execution

At the bottom of the interface, there are three buttons: Save to File, Load from File and Configure Device.

- **Save to File**

  To save the configuration to the computer. It has a specific file format as follows:

  **CmmddyyThhmm_siteID.cfg**

  The C indicates the configuration; the time mmddyy and hhmm will follow the unit's current date (month-date-year) and time (hour-minute), T is the separator between date and time, and siteID is the unit's name.

- **Load from File**

  Users can use the saved configuration to populate the interface, but it has yet to enter the Device.

  It has a similar function to Open Parameter File from the menu; the users will not see the directory structure but the list of configurations directly (see Figure 39).

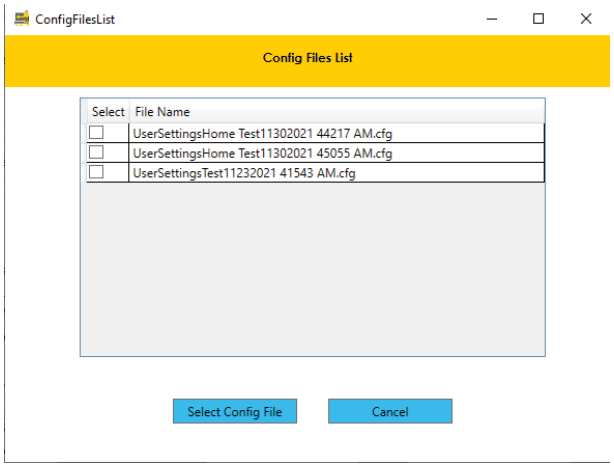


*Figure 39: Config File List*

- **Configure Device**

  users can send the configuration to the Odalog unit. After the users are satisfied with the setting, they can click this button.

### 8.2.2.2. Manufacturing

The Manufacturing tab has the information about the unit, the Model, the Firmware version, the Sensor type, and the Unit serial number (see Figure 40).


*Figure 40: Manufacturing*

### 8.2.2.3. Modify User Details

Users can change the login information from this tab; the username and password limit to 5 characters (see Figure 41).

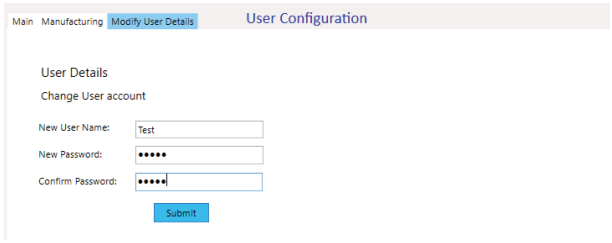


*Figure 41: Modify User Detail*

## 8.2.3. Open Parameter File

This feature has a similar function to the Load from File button in the Main tab of the Instrument Parameters. It requires a connected unit to access the File, it will open the default directory structure, and when users open a file, it will appear as Figure 36.

## 8.2.4. Download Log

Users can access this function after successfully connecting to a unit. A **Download Log** button allows the users to download the unit data (see Figure 42).

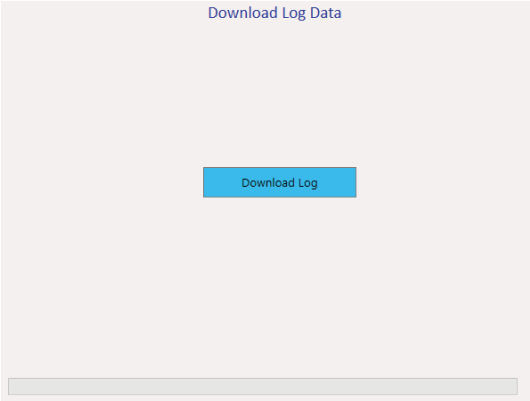


*Figure 42: Download Log Interface*

While the instrument is downloading, the user may still navigate and use OdaStat NX's non-communication functions, e.g., viewing a graph. However, options such as Setting Date and Time and Instrument Parameters will be disabled.

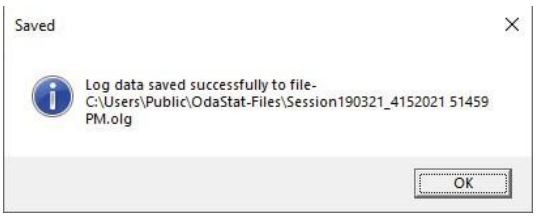


*Figure 43: Download Completion Pop-up*

The OdaStat-NX will save the downloaded data with the default file name as follows:

**DddmmyyThhmm _UnitSN.olg**

The D in the name indicates Data File, with ddmmyy and hhmm following the current unit date (month-date-year) and time (hour-minute), T is the separator between date and time, and the UnitSN is the unit's serial number. The users will receive an announcement with that file name and its location (see Figure 43).

Please note this download log function will download the last session only.

**IMPORTANT NOTE:**

If the users try to download the data for the second time, the same file name will be used if the action is taken within a minute, otherwise the OdaStat-NX will create a new name.

## 8.2.5. Clear Log

The clear log function is accessible from any window or function and does not have a particular interface; however, when users click this function, they will see a pop-up window asking for confirmation to clear the data from memory (see Figure 44).

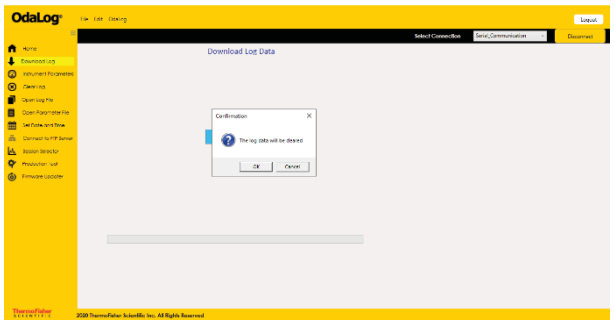


***Figure 44: Clear Log Warning***

## 8.2.6. Open Log File

Users can choose the **Open Log File** function to access previously downloaded data; it will open the default log data directory (see Figure 45). Only an OLG file created by the G20 unit is compatible with this function.

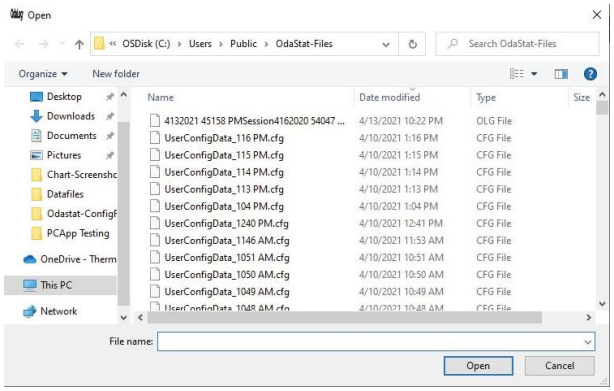


***Figure 45: Accessing Odalog Data on PC***

After file selection, the **OdaStat-NX** will load the file into the **Session Selector**, there is no need to repeat the process as any session recorded in the **Session Selector** will stay even after the users close the **OdaStat-NX** application.

## 8.2.7. Session Selector

The Session Selector will list all the registered sessions in the **OdaStat-NX** (see Figure 46); it shows the list of files that

is currently in **C:\Users\Public\OdaStat-Files\ folder** location. An entry will be created after you download the data from Odalog unit or copy paste a file into that folder (file taken from other PC). File deletion will remove the entry from the list.

Users can choose to view one or multiple sessions; the latter is like **Joined Session** in the old **OdaStat-NX**. The Chart will display data from all the ticked sessions.

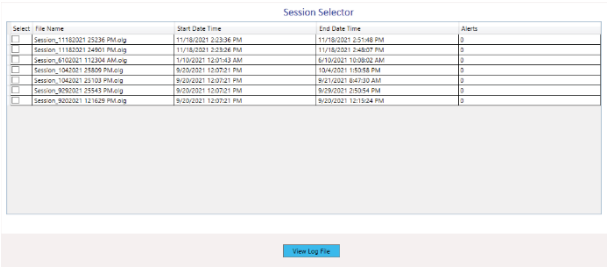


***Figure 46: List of the Session in Session Selector***

## 8.2.8. Connect to FTP Server

Users can access the data stored in their FTP server (G20N RTx) using this menu after providing the server credential (see Figure 47). It will show the directory list in the server, choose the correct directory to get the data (see Figure 48).

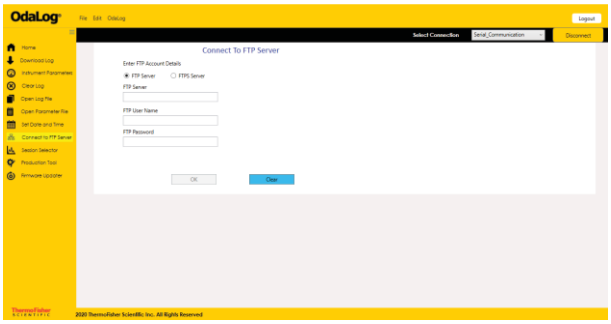


***Figure 47: FTP Client Credentials***


***Figure 48: Folder List on the Server and Function of Operation***

There are three functions to use:

- **Open Data File**

  This function allows the user to view of the list of uploaded data in the server; users can select one or more to download the data as an OLG file.

- **Delete Data File**

  This function allows the user to delete the chosen File; use this with caution.

- **Online Parameters**

  This feature provides an interface to modify the existing program; the modification will occur on the following data transfer during which the unit will pick up and apply the new setting (see Figure 49).

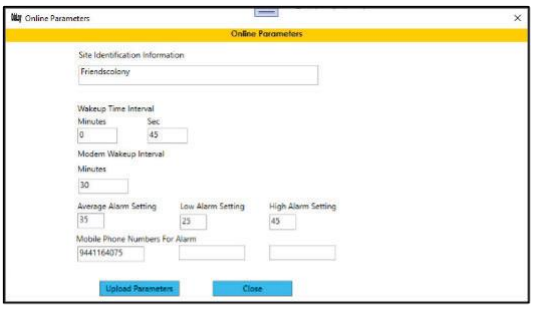


***Figure 49: Online Parameters***

# 8.3. Extra Menu

The extra menu covers additional menu external to the standard unit operational, even though the menu location can be seen as in the Main Menu. Some menus are part of production, others are for internal process. Users should let the authorized distributor or the factory to assist them in using these menus.

## 8.3.1. File Preference

The file preference function is accessible from the Top menu; it controls the folder's location for saving the data log files, config files, the Chart, and the certificate files (see Figure 50).

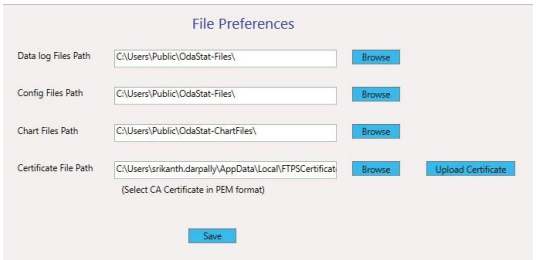


***Figure 50: File Location Preferences***

## 8.3.2. Firmware Updater

This **Firmware Updater** function allows the user to update the Odalog G20 firmware, the process is available through UART. It is not accessible on Bluetooth connection (the button is grayed out). Firmware update can be initiated by two methods:

- Users can connect to the unit via UART normally on **OdaStat-NX**, access the firmware update function, select the firmware update file (using **Browse**), click the **Update Firmware** button and finalize with the **Reset Device** button.

  The upgrade process will be shown by the indicator bar. Wait until the process is completed.

- Users can switch OFF then switch ON the unit or **RESET** the unit (from the menu). During bootup process, users may connect to the unit via **UART** on **OdaStat-NX**, even though it is not going through UART menu.

  Go to the Firmware Update on **OdaStat-NX**, select the new firmware file and click **Update Firmware**.

  This second option does not need to use Reset Device because it already in the bootup process. Wait until the upgrade process is completed.

There is an additional functionality which introduced in **OdaStat-NX**, the **New Battery** button. The operation must be carried by an authorized distributor engineer, they must press this button after change the battery to reset the battery level.

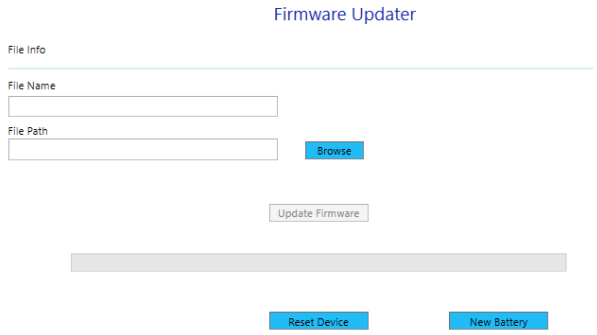


***Figure 51: Firmware Updater***

**NOTE:**

1. Please get assistance from the authorized distributor to update the firmware.
2. Please ensure to fit a new battery to get the correct battery indicator, because a half-used battery may provide an incorrect indicator.

## 8.3.3. Production Tool

The **Production Tool** is used to set the unit model and serial number during manufacturing process in the factory, it is not available/ accessible for users or any authorized distributor. The interface has a restricted access using a password.

# 8.4. Chart

Users can see the data as a chart (see Figure 53) via Session Selector. There are four important sections in the chart interfaces:

- The menu (**1**) provides access to extra export functions such as PNG, PDF, and CSV; users can also save the whole charts as another session (have more than one session).
- The menu allows users to view one or more selected data sets for a better focus. Users can view the statistic of up to four individual parameters such as temperature, humidity, $H_2S$ and battery level (see Figure 52).

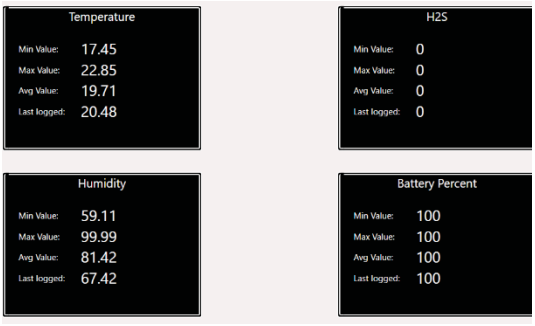


***Figure 52: Static Data of Four Parameters***

- An additional analysis chart for the T90 process is available to understand the sensor better. The T90 plot will use a measurement data with 5-second rate. Users need to provide the target gas information to see the T90 analysis chart.
- Chart (**2**) shows the data as a line chart; the number of data depends on the parameter's selection. Moving the mouse slider up/down will allow the user to zoom in and out of the Chart.

  The default parameter for zooming is temperature when the cursor stays in the chart area while moving the slider.

  User can zoom in/ out other parameter after placing the cursor on the targeted parameter Y axis and move the slider.

  For example: To zoom $H_2S$ parameter, put the cursor on the yellow line of Y axis and move the slider.
- The Chart X-Axis is in time domain and the default chart title is the **Sensor Data Chart**. Users can see the unit serial number and Site ID as the chart sub-title.
- The axes (**3**) show the value ranges of the data; moving the mouse slider on the selected axis will allow zooming on that data.
- The chart legend (**4**) indicates the displayed parameters, including the start and end time/date.

**NOTE:** If a session has big data size, the Chart display will have a slow response specially on the zooming function.

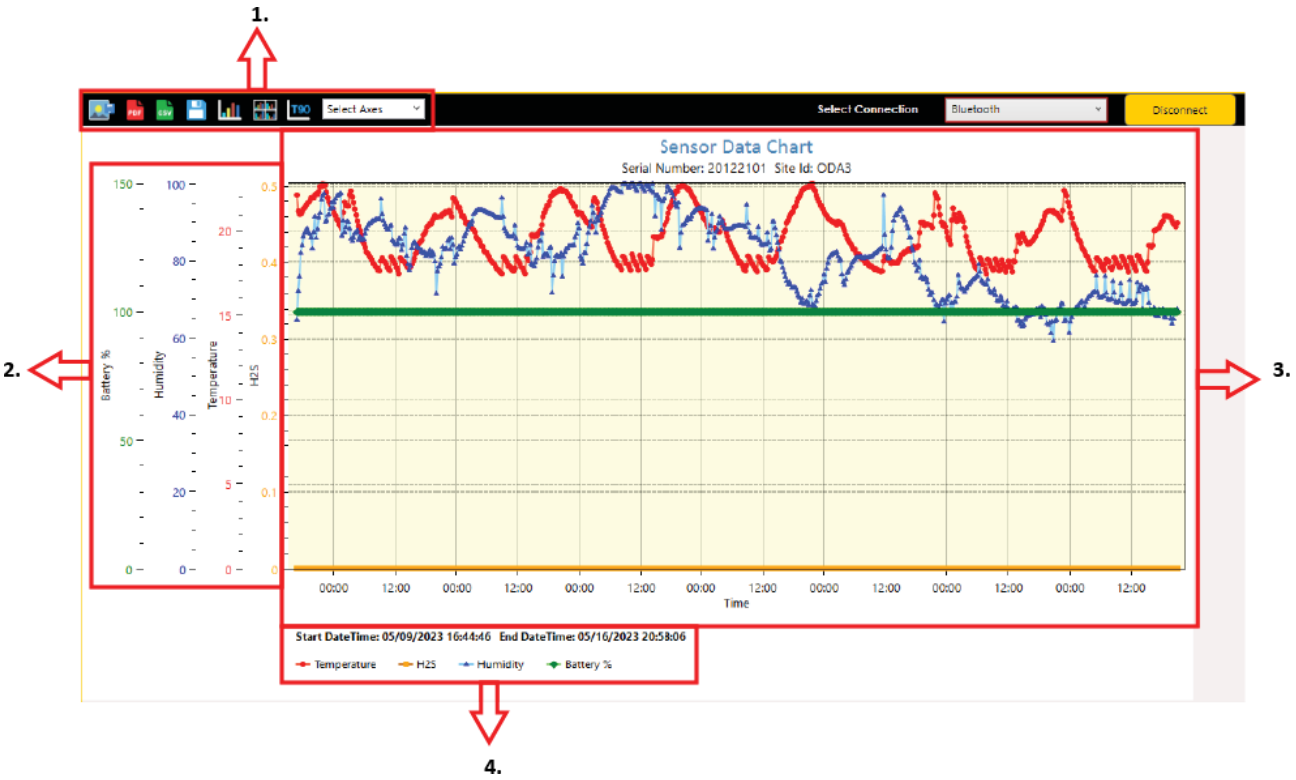


***Figure 53: Chart Overview***

# 9. Unit Care

## 9.1. Deployment

### 9.1.1. Installation

There are several considerations when deploying the G20 series unit, users must be aware of the following:

- **Avoid direct sunlight**

  Positioning the instrument in a shady/sheltered area where possible helps to avoid the elements affecting your data's accuracy.

- **Securely fasten when deployed**

  It's a good idea to chain and padlock your instrument in place if it's situated in a publicly accessible area.

- **Keep it dry**

  If used in a wet-well situation, ensure the instrument is situated above the 'high-water' mark; the instrument is not meant to be submerged.

### 9.1.2. Reading Accuracy

Users should be aware there are some factors that can affect the reading accuracy, understanding them will allow a higher accuracy. The following are the examples:

- **Gas nature**

  Users need to consider the nature of the measured gas; some gases are 'heavy' and will naturally accumulate close to the floor/ground.

- **Ventilation – Striking a balance**

  Users need to strike an airflow balance. The air movement in the deployment area can affect the gas accuracy measurement.

  Ensure sufficient airflow to allow natural diffusion of target gas to where the instrument is taking readings. Too much airflow may mean target gas passes too quickly over the sensor for the sensor to respond.

- **Heavily shielded areas**

  It's common for the Odalog to be placed into areas covered by thick concrete and/ or metal covers. For the G20N RTx, it is essential, however, that the modem can still transmit when deployed. Ensure reliable communication continues during 'startup' mode when all covers/lids are closed on the area. If the open-air signal is poor, the signal on a shielded deployment area is likely even worse.

### 9.1.3. MODBUS Installation

The unit complies with ATEX certification for deployment in the explosive atmosphere. To utilize the MODBUS connection, the users must add a safety barrier unit to bridge between the explosive area (installation site) and the non-explosive area (control panel).

This barrier device (ATEX-rated Galvanic Isolation barriers) will protect electrical signals from causing ignition. Please refer to Figure 26 for an example of implementation.

While we do not put any recommended brand for the barrier; we strongly advise the users to use ATEX certified barrier.

### 9.1.4. Getting the Modem Signal

The signal strength which is shown on the **STATUS** screen in percentage (%), the signal bar on the display, and in the data are not real-time measurements. The shown value is taken based on the signal measurement when the modem started for FTP transfer.

If the modem failed to initiate FTP transfer because of low signal, the signal strength reading will not be available. There are several factors that may assist or affect the signal strength:

- **Surface Mount Antenna**

  Use the Odalog Surface Mount Antenna (optional accessory) for deployment areas to improve signal strength in applications where the signal is poor or unreliable.

  This antenna will also help to improve battery life, as improved signal strength results in less power usage.

- **Signal Interference**

  The G20N RTx uses wireless transmission to connect to the internet server. Communication can sometimes be disrupted by similar devices and by electrical interferences from nearby equipment.

  Ensure the Odalog is not placed near high voltage cables or electrical machinery (e.g. pumps).

### 9.1.5. Enabling the Modem

After sending the program to the unit, users need to enter TRANSMIT MODE to enable the FTP transfer and SMS alarm. Please check the **OdaStat NX** section for more information.

**NOTE:** The unit does not automatically activate the modem when getting its configuration.

# 9.2. Calibration

## 9.2.1. NULL

- When users notice the reading is not 0.0ppm, in an atmosphere where no $H_2S$ gas is present but has a slight fluctuation, it will be necessary to perform a **NULL** Calibration.
- Ensure there is no $H_2S$ present surrounding the unit (i.e., testing bench, office room).
- Stop logging if you see the **LOGGING** indicator flashing.
- Place the magnetic tip at the **Menu** marking on the yellow label, hold it there until **NULL** appears, then remove the magnetic end.
- You will see the **NULLIN Prog** on display; wait for one minute before seeing **SWIPE Y**.
- Swipe the magnetic end to the **Y** side to confirm the completion of NULL. Followed by **DONE** on display. The NULL process is complete.

**IMPORTANT NOTE:**

There is a 5-seconds window after **SWIPE Y** appears. If you do not confirm **Y** using the magnetic tip in time, the **NULL** Calibration will be cancelled.

## 9.2.2. SPAN

- If the T90 test is beyond the standard 30 seconds or the reading is incorrect, consider doing a **SPAN** Calibration.
- Due to a risk factor concerning $H_2S$, please send the unit back to your supplier or use the service of a known gas calibration company.
- Set and write the unit configuration calibration gas value per the target gas (i.e., 99.4 ppm) via the OdaStat-NX (see Figure 54).

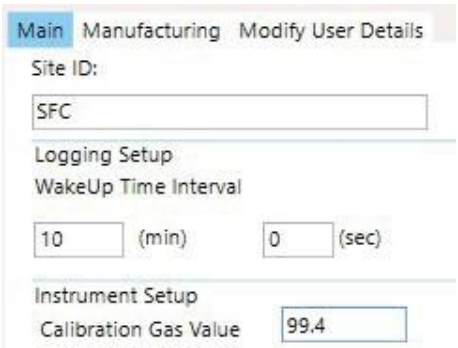


***Figure 54: Calibration Gas Setting***

- Ensure to perform the $H_2S$ gas calibration properly with proper equipment (i.e., fume cupboard, control valve, flexible tubing). Prepare a calibration gas bottle or if you have it as part of the fume cupboard.
- Have a calibration fitting connected to the clear tubing and place it underneath the unit.
- Have the control valve connected to the gas bottle and the other end of the tubing connected to the valve (see Figure 55).
- Open the valve at 250–500 ml/minute; there are two methods of waiting for the gas to reach stability.
- You can read the measurement from the display (**INST** value).


***Figure 55: Calibration Setting Arrangement***

- When you notice the gas reading no longer increase (usually after 2 minutes), place the magnetic tip at the **Menu** marking on the yellow label, hold it there until **SPAN** appears, then remove the magnetic end.
- You will see the **SPANNIN Prog** message on display; wait for 1 minute before the screen shows **SWIPE Y**
- Swipe the magnetic end to the Y side to confirm the completion of **SPAN**. Followed by **DONE** on display.
- You may see an INST reading which is different/ far from the target gas; that is OK. Keep the gas flow and start the logging to check the reading after SPAN. The reading would be near the target gas.
- Close the valve and disconnect the fitting. You will see **DUE CAL** on the status screen to become 255. This means another calibration is due in the next 255 days.

**IMPORTANT NOTE:**

There is a 5-seconds window after **SWIPE Y** appears. If you do not confirm **Y** using the magnetic tip in time, the **SPAN** Calibration will be cancelled.

## 9.2.3. T90 Test

- You may choose to run the T90 test after the **SPAN** process to check the sensor response time to the gas.
- To observe T90, you can do directly with the Odalog G20 unit or you may use a Honeywell evaluation kit.

- When doing the T90 test directly, set the measurement interval in Odalog G20 configuration to 5 seconds.
- Open the valve and let the gas flow for a minute, download the data and observe the chart using the **OdaStat-NX**.
- When using Honeywell evaluation kit, fit the sensor into the gas chamber and connect to a PC, enable the sensor reading at 1 second interval which will be plotted into the chart.

**IMPORTANT NOTE:**

Please consider replacing the sensor if the DUE EOL value at 30 or below, as it means you can only use the sensor for another month.

# 10. Troubleshooting

## 10.1. Main Errors

The G20 unit shows an error message on the display when it detects an error during a particular process or a fault on specific components. The following Table VII shows all possible errors on display; each event has information about the possible causes and solutions.

Some error messages occur when accessing the unit STATUS screen; others can happen in a flash; or during calibration processes.

***Table VI: Error Description and Solutions***

| Error Display | Cause/ Description | Solution |
|---|---|---|
| MEMORY 0 GB | • Memory is low<br>• The SD card is not properly mounted/ being removed while the unit is ON<br>• Battery nearly flat | • Delete the old data<br>• Perform RESET (from the menu) on the unit or contact the manufacturer or representative<br>• Replace the battery |
| Due EOL 0 | • The sensor reaches the end of life<br>• The date/ time is not being set yet | • Replace the sensor<br>• Set the date/ time in OdaStat-NX |
| Due CAL 0 | • The sensor need recalibration<br>• The date/ time is not being set yet | • Calibrate the sensor<br>• Set the date/ time in OdaStat-NX |
| Failed | Cannot perform NULL/ SPAN | Repeat the process |
| FTPOPNErr | Failed to establish FTP connection | Check the modem signal, server credential, and security setting (FTP/ FTPS). |
| FTPREDErr | Failed to read from FTP server | Check the modem signal and possible previous transfer corruption. |
| FTPWRTErr | Failed to write to FTP server | Check the FTP server setting against writing action. |
| InvalSens | Invalid sensor, specific code is not detected | Check the sensor contact point and ensure to use the digital sensor from ThermoFisher. |
| ModemErr | Failed to communicate with the modem | Hard reset the unit or reinstall the firmware. |
| SDCard Failed | Fail to access SD card, battery nearly flat | Replace the battery |
| SensorBad1 | The sensor is too dry | Bring the unit to a chamber with high humidity. |
| SensorBad2 | The sensor is too wet | Bring the unit to a drying chamber for a couple of days. |
| SensorBad3 | • The sensor calibration is due<br>• Incorrect unit's time | • Calibrate the sensor<br>• Set the time on the unit |
| SensorBad4 | The sensor reaches the end of life, loses contact, or short-circuits | Clean the sensor or replace the sensor. |
| SensorBad5 | Fault on sensor electrodes, temperature out of range | Replace the sensor. |
| SensorBad6 | • The sensor bump test is due<br>• Incorrect unit's time | • Calibrate the sensor<br>• Set the time on the unit |
| SensorBad7 | The sensor user factor setting is incorrect | Incorrect firmware version, contact the nearest distributor/ manufacturer |
| SensorBad8 | Fault on sensor's memory | Hard reset the unit, if the problem persists replace the sensor. |
| SIGBAD | Low signal, unable to open data connection | Check the APN setting, move the antenna. |
| SIM Err | Cannot recognize the SIM card | Use a different provider SIM card. |
| Sleep | Low power, sensor forced to sleep[11] | Replace the battery |
| SMSErr | Failed to send SMS | Check the modem signal[12] |

[11] Cannot read sensor which will cause disable logging

[12] Change the antenna location if possible

# 10.2. Events

Besides the errors, there are a couple of possible events that users may find during the utilization of the Odalog G20 series instruments. These events may lead to an error at later stage or simply require intervention from the users or require the users to return the unit to us for assessment, calibration or service.

The following Table VII shows most probable events that the user may see.

***Table VII: List of Possible Events***

| Category | Description | Solution |
|---|---|---|
| Battery | Operating time is less than 6 months | • Observe the sampling rate<br>• Contact the manufacturer or representative |
| Display | Missing a segment in the display | Contact the manufacturer or representative |
| Menu | Freeze, no response to a magnet swap | Contact the manufacturer or representative |
| Menu | Won't trigger an action (Logging, Comms) | • The cause is because undetected SD card, lost communication with the sensor, or sensor DUE becomes 0.<br>• Check the STATUS for remaining memory, DUE EOL and DUE CAL.<br>• Perform RESET (from the menu) on the unit or contact the manufacturer or representative |
| Logging | Failed to download logged data | • The cause is because the logging suddenly stops, most likely because the interval is too fast or an issue with the SD card<br>• Change the logging interval to 30 seconds or more.<br>• Perform RESET (from the menu) on the unit or contact the manufacturer or representative |
| Logging | Incorrect value, reading fluctuation or less accurate reading for $H_2S$ | • Recalibrate the sensor<br>• Replace the sensor<br>• Contact the manufacturer or representative |
| Logging | Data time tag is incorrect | Contact the manufacturer or representative |
| Communication | • Bluetooth (BLE) mode won't start<br>• Difficult to connect | • Check the battery voltage indicator.<br>• Move to another area with less interference |
| Communication | USB (UART) mode won't start | Check the battery voltage indicator |
| Communication | The unit crashes on using 2-wire RS485 for MODBUS communication | Use 4-wire RS485 configuration |

**Australia:**
For customer service, call 1300-735-292
For service and calibration, call 1300-736-767
To email an order, ordersanz@thermofisher.com

**New Zealand:**
For customer service, call 0800-933-966
For service and calibration, call 0800-933-966
To email an order, ordersnz@thermofisher.com

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