![GSS Gas Sensing Solutions logo]

# EvaluatIR-A
# Evaluation Kit
# User Guide

# USER GUIDE

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**INTRODUCTION**

This evaluation kit is designed to provide a fast and easy method to measure and record $CO_2$ data using the GSS CozIR®-A $CO_2$ sensor.  Once set up, the kit is designed to run fully autonomously and can be left for weeks at a time without the need for use intervention.  Actual battery life will vary depending on the sensor setup.

The evaluation kit includes the EvaluatIR-A box, and a USB cable.  The EvaluatIR-A PC software application can be downloaded from the GSS web site.

https://www.gassensing.co.uk/resources?resource=software

As well as recording $CO_2$ data, the software application allows the user to record and analyse other environmental conditions such as pressure, relative humidity and temperature.

For more technical information on the CozIR®-A $CO_2$ sensor used in the kit, download the appropriate data sheet from here: https://www.gassensing.co.uk/resources?resource=datasheet

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**INITIAL SETUP**

The EvaluatIR-A comes boxed with a USB lead.

The EvaluatIR-A requires the addition of two AA batteries to power the unit. Unscrew the battery cover using a small Phillips screwdriver.



Insert the batteries as per the directions in the battery compartment. Fit the battery cover back into place. The unit is now ready for use.

**SOFTWARE INSTALLATION**

The EvaluatIR-A software is available direct from the GSS web site.  Download the .zip file to your computer.  Unzip and click on Setup.exe and follow the instructions on the screen.

The software has been extensively tested to run on a Windows 10 platform.  However, no guarantee can be given for successful operation on other platforms. The software will not run on Android or iOS.

**CONFIGURING THE EVALUATIR**

Connect the EvaluatIR-A to the PC using the supplied USB lead.  The green LED on the top of the unit will now illuminate.



**USB DRIVER**

The EvaluatIR contains an integrated circuit that converts between the UART interfaces inside the box and the PC USB interface.  Recent versions of Windows will automatically identify and install the USB driver when you plug in the lead.  If you are prompted to locate a driver, download from the FTDI website: https://www.ftdichip.com/Drivers/VCP.htm Choose "VCP Drivers" and select the correct driver for your operating system.

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## RUNNING THE SOFTWARE

Look for the filename **GSS EvaluatIR Application**. Double click the software to launch the application. The opening screen is shown below.
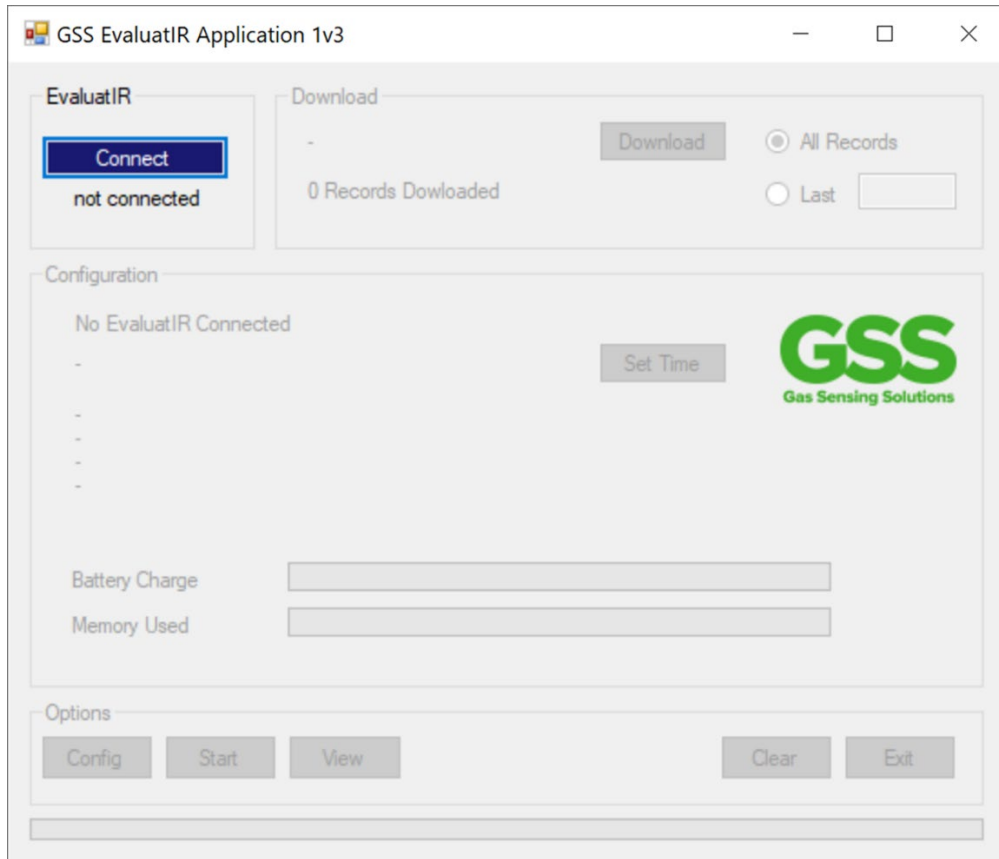


Click on the Connect button to access the pull-down menu.

Click on the pull-down menu to access the communication port used by the EvaluatIR-A. It may not appear as COM3 but if you are unsure what communications port the platform is attached to then go to the "Device Manager" on your machine and plug / unplug the EvaluatIR-A. This will show you which port the device is connected to.
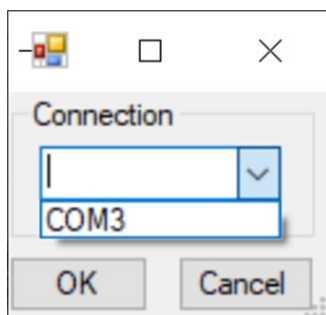


Select the correct COM port and click on the 'Connect' button. The software application will now show the unit is connected, the battery level and the memory status.
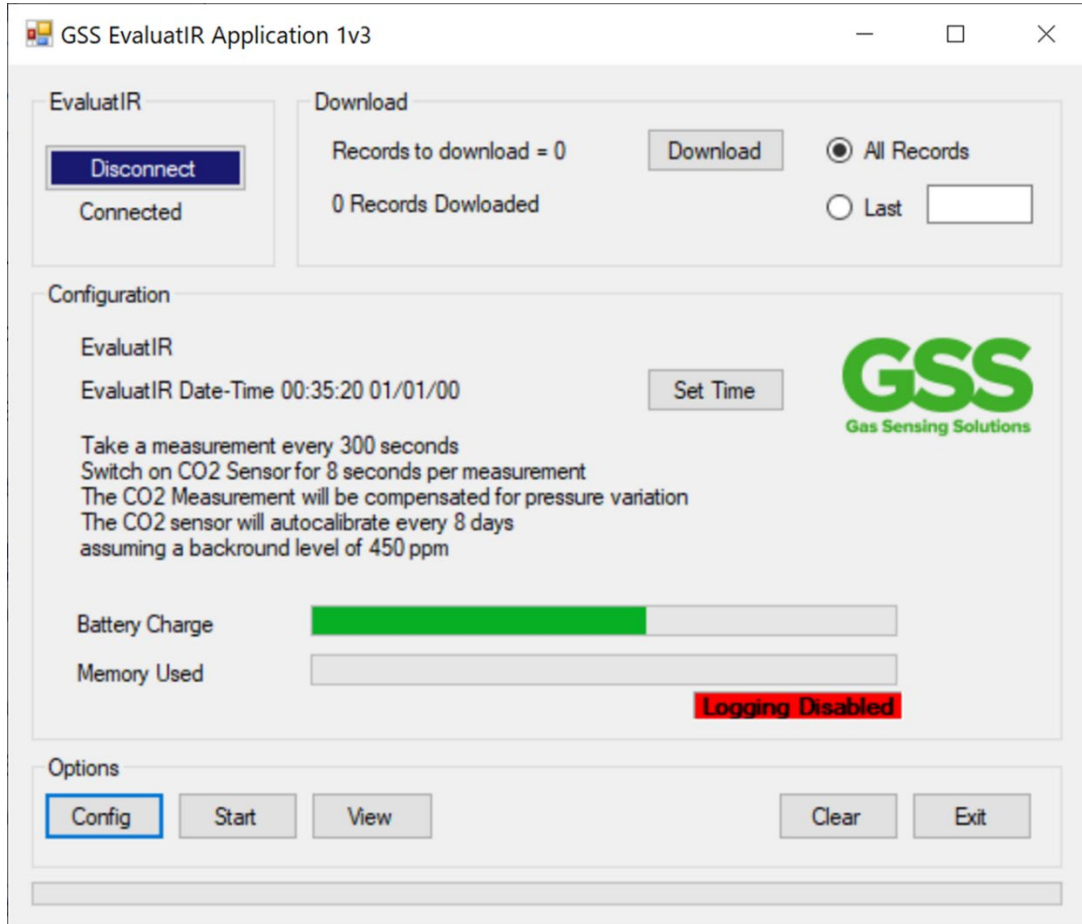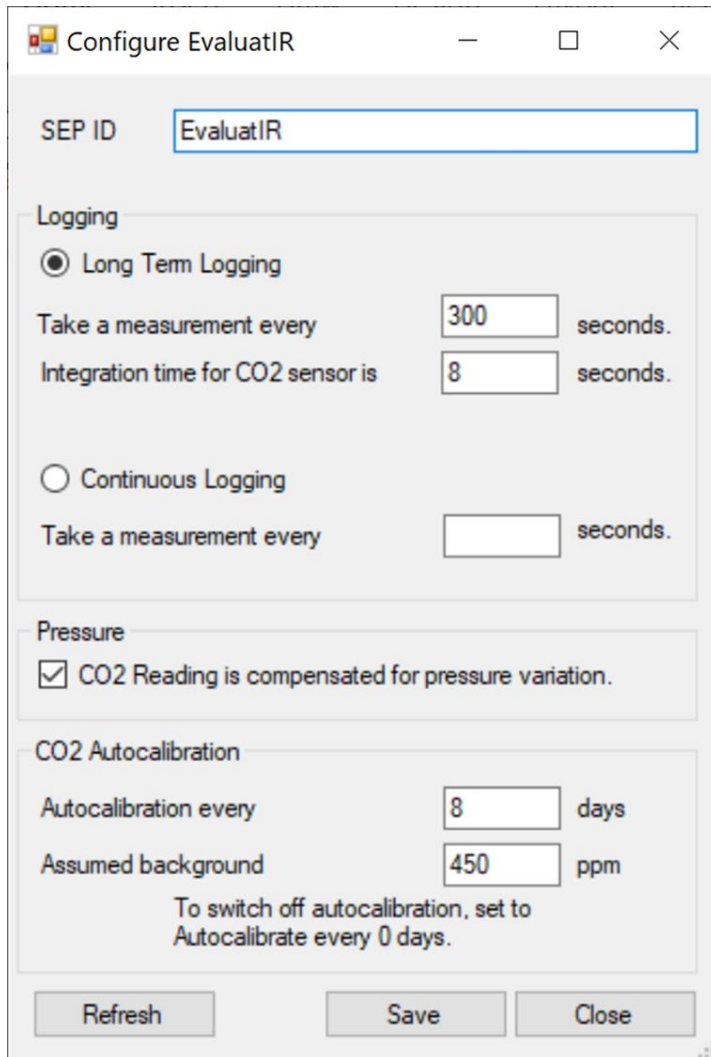
If this is a new setup or new batteries have been installed, the time field will be showing all zero.

Push the 'Set Time' button to set the EvaluatIR-A to the PC time. Note this will now run independently and is used to time stamp the internal measurements for subsequent read out. It will not be updated with respect to PC time or daylight saving time unless the set time button is clicked with the unit connected to the PC

The current configuration for the EvaluatIR-A is shown in the main body of the display.

## CHANGING THE CONFIGURATION

If the configuration is to be changed click on the "Config" button to display the setup screen.



The ID of the EvaluatIR-A unit may be set by user. Overwrite the default ID name and save. This will be output on the retrieved data file to indicate which unit the data was retrieved from. The ID is subject to a maximum character length of 20.

The EvaluatIR-A can be set up to log $CO_2$ levels either periodically or continuously.

For periodic logging, click on 'Long Term Logging' and set the measurement period. The integration time is the length of time the $CO_2$ values are averaged every measurement period. In the example, 8 seconds of $CO_2$ values are averaged every 300 seconds.

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For continuous logging, the EvaluatIR-A will log $CO_2$ values at the pre-set period.

The sensor can also be set up to provide a pressure compensated $CO_2$ value. This uses the internal pressure sensor to compensate the $CO_2$ value for any pressure variations.  Note this is only used to correct the output when it is downloaded.   It can therefore be changed to download both corrected and uncorrected versions of the same dataset.

The EvaluatIR-A has an 'Auto-Zero' function, where the zero set point is periodically reset.  See the CozIR®-A sensor data sheet for more details.  The EvaluatIR-A can be set to force a background zeroing of the sensor to a user defined $CO_2$ value at a period set by the user.

Once all the values are set, they must be saved by hitting the 'Save' button.  'Close' exits the configuration without saving.  'Refresh' updates the values to the last saved configuration.  The values will be updated on the main body screen by pressing 'Refresh'.

**DATA RECORDING**

Once the Evaluation platform has been configured, it can now be used to record data. Click the 'Start' button and the EvaluatIR-A will start logging indicated by the logging enabled script in the application. The script 'Logging Disabled' highlighted in red will change to 'Logging Enabled' in green.
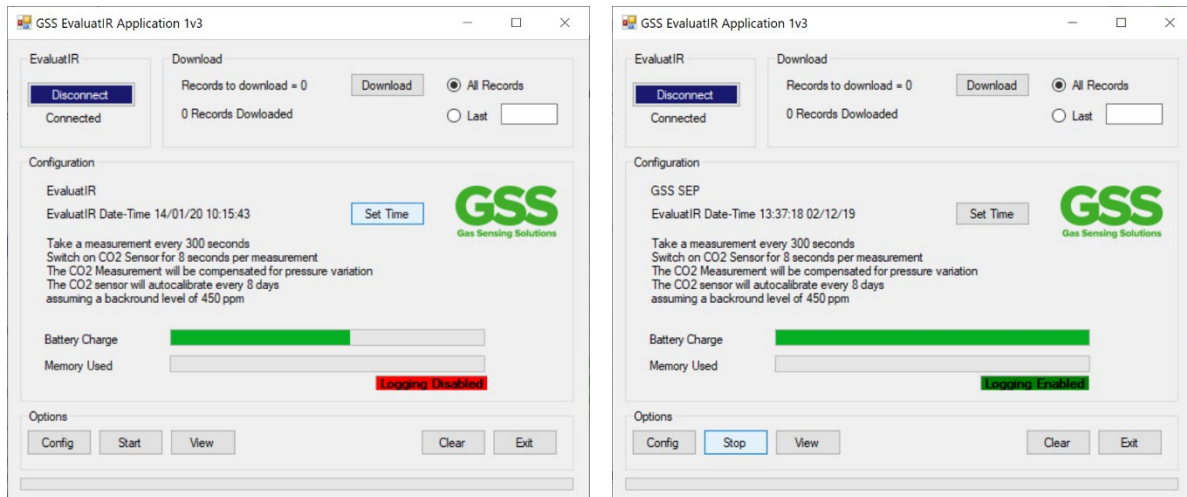


The evaluation platform can now be disconnected from the USB cable and will record data autonomously. The LED on the EvaluatIR-A will flash briefly at each reading point. Note that if the measurement interval is long, this will happen infrequently.

*Note, the EvaluatIR-A must be disconnected from the USB cable, before data will be recorded.*

**DATA RETRIEVAL**

Launch the software application as before.  Plug the USB lead into the EvaluatIR-A and the PC.  Click 'Connect'.  The software application will show the number of data points that have been stored since the EvaluatIR-A was started.
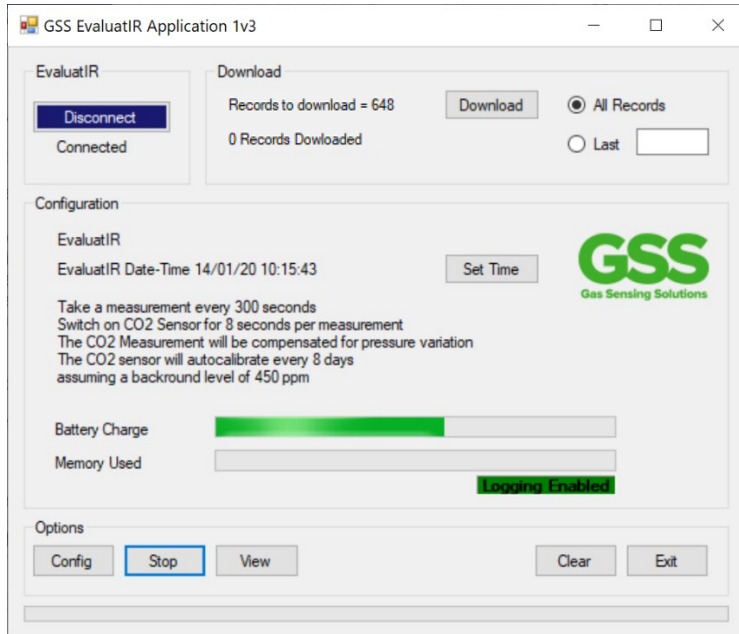


To download data, firstly select 'All Records' or ''Last' and enter the number of records to download. Click the 'Download' button. The next screen will ask for a location to save the file to, and the file name.
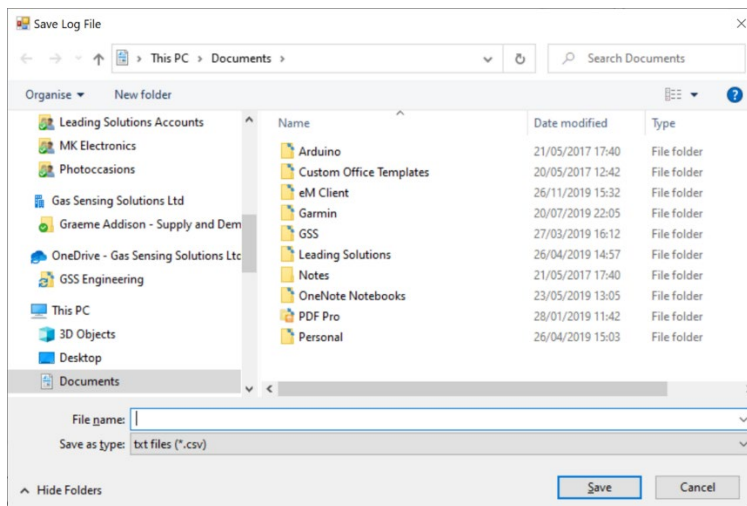


Once these have been input select the save button.  The data will now download, and a green progress bar will move across the lower part of the screen.

When the data download is complete, a box will appear indicating the download is complete. This can be cleared as required. Note that if a file name is used, the new data will be appended to the old file. The file is in CSV format.

| Download | ✕ |
|---|---|
| Download Complete | |
| OK | |
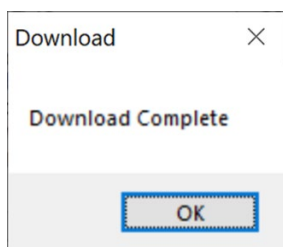
The data file can now be accessed via a spreadsheet solution for subsequent analysis.

**COMMUNICATING WITH THE CO$_2$ SENSOR**

Access to all CO$_2$ sensor functions and register settings is available to the user using the Terminal View.  Terminal View allows the user to read and write directly to the CozIR®-A sensor using the UART command set.  Click on 'Speak to CO$_2$ Sensor'.

The 'Speak to CO$_2$ Sensor', when selected allows commands to be sent directly to the sensor.  Refer to the CozIR®-A sensor datasheet for description of these commands.

'Sensor Calibration', when the 'Speak to CO$_2$ Sensor' option is selected, you are able to re-zero the sensor by entering the current CO$_2$ level in the test box and clicking 'Calibrate'.  The sensor will then be adjusted to read this value.  This can be confirmed by polling the sensor.
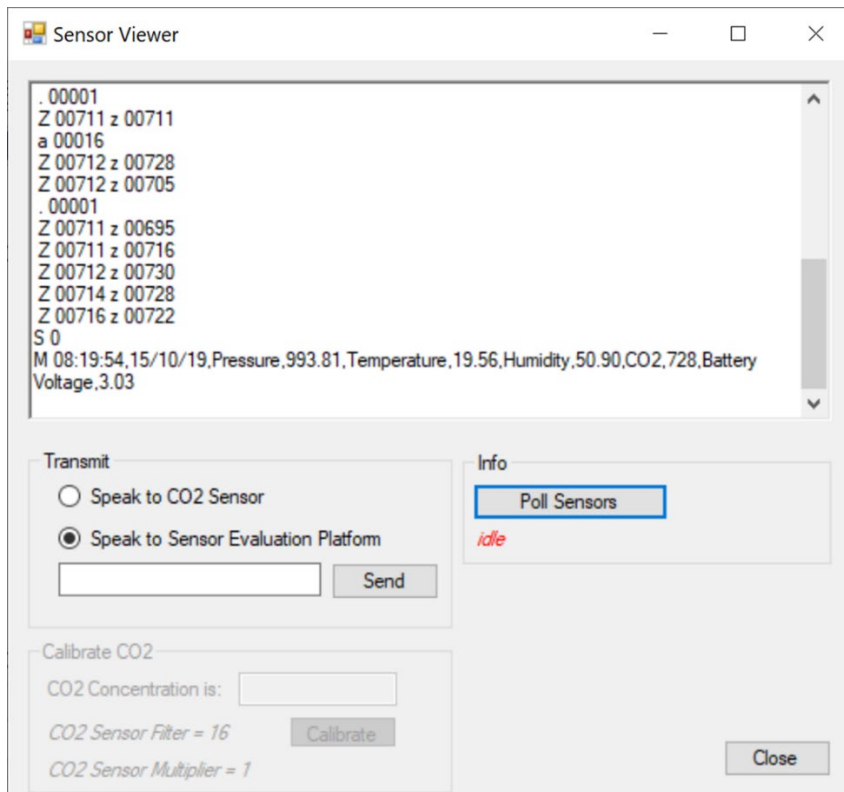


**POLL SENSORS**

By clicking the Poll button, the sensor is accessed and read according to the setup parameters.  If the configuration is set for long term logging, the sensor will be read in the same way.  After power on, wait the configured integration time before the reading is displayed.  A seconds count down will be displayed.

The above image shows the result of a Poll Sensors request, showing values for Pressure, Temperature, Humidity, CO$_2$ and battery voltage.

## COMMUNICATING WITH OTHER  SENSOR

The 'Speak to Sensor Evaluation Platform' is primarily for debug purposes.  They are not intended to be used in normal operation.

| Command | Rd / Wr | Parameters (n) | Description |
|---|---|---|---|
| %S n | Wr | 0 or 1 | Sensor on / off |
| %L | Rd | None | Returns status of logging, 0 disabled 1 enabled |
| %L n | Wr | 0 or 1 | 0 disables logging, 1 enables logging |
| %D | Wr | None | Download all data |
| %D n | Wr | 1 – number of logs | Download last n logs |
| %RESET | Wr | None | Full reset of unit, factory reset |
| %O n | Wr | 2 - 120 | Sensor on time (s) |
| %P n | Wr | 2 - 3600 | Period between measurements (s) |
| %T | Rd | None | Read time<br>hours:mins:secs day/month/year |
| %T dd/mm/yy hh:mm:ss | Wr | DOW day/month/year hours:mins:secs | Set time DOW Mon = 1<br>DOW day/month/year<br>hours:mins:secs |
| %I | Rd | None, Status ID,BV,BS,USED,INT,ON, PRESS,BG,DAYS | Returns device ID, + other status<br>BV –    battery voltage (mv)<br>BS -    battery status<br>            0 ok, 1 low<br>USED-  0 – 1 scale of used mem<br>INT-    measurement period (s)<br>ON-    sensor on time (s)<br>PRESS-  Pressure compensation,<br>            0 off, 1 on<br>BG –    background $CO_2$ level<br>DAYS –  auto-zero interval |
| %I str | Wr | Str, max 20 characters | Writes SEP ID string |
| %M | Rd | None | Forces a read of sensors |
| %C | Rd | None | Returns pressure compensation status<br>0 disabled, 1 enabled |
| %C | Wr | 0 or 1 | Sets pressure compensation status<br>0 disabled, 1 enabled |
| %A | Rd | None | Returns auto-zero status<br>Days<br>Level |
| %A n m | Wr | Days, level | Set auto-zero to period days & target value |
| %V | Rd | none | Return firmware version info |

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**TROUBLESHOOTING**

The EvaluatIR-A can be configured easily and will operate "out of the box". In the event of any issues please try the following troubleshooting steps.

| | |
|---|---|
| Unit does not log | Check batteries are correctly inserted<br><br>Replace batteries<br><br>Check settings<br><br>Check logging is enabled |
| Unit does not retain real time clock settings | Check batteries are correctly inserted<br><br>Replace batteries |
| Unit does not connect to PC | Ensure software is installed correctly – if necessary, please de-install and re-install as required<br><br>Check the correct com port has been selected as per the device manager note above |
| Unit flattens batteries prematurely | Set logging to a longer period to reflect the measurement frequency required |

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**ADDRESS**

Gas Sensing Solutions Ltd.
Grayshill Road
Cumbernauld
G68 9HQ
United Kingdom

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**REVISION HISTORY**

| DATE | RELEASE | DESCRIPTION OF CHANGES | PAGES |
|------|---------|------------------------|-------|
| 04/06/2021 | 1.0 | First revision | All |
| 11/06/2021 | 1.1 | Update to webiste links | P. 3 |