



Intelligent Sensing
Anywhere

CLOG500

User Manual

ISA – Intelligent Sensing Anywhere

Rua Pedro Nunes, Edifício D

3030-199 Coimbra, Portugal

Phone: +351 239 791 090

Fax: +351 239 791 099

Email: info@isasensing.com

Data	Versão	Descrição	Autor
16/07/2014	V0.01	First release of document.	Artur Vieira
03/09/2014	V0.02	Added option for variant EXC5_20XY possibilitie to have possibilitie to have 2 sensors.	Artur Vieira
18/09/2014	V1.0	Revision	Ester Soares
27/01/2015	V1.01	Changes for FCC certification	Artur Vieira
02/03/2015	V2.00	Revision	Ester Soares

Índice

1	General Information.....	1
1.1	CLOG500 Model Numbering.....	1
2	FCC PART 15 compliance.....	2
2.1	RF Exposure Information.....	3
3	Warnings.....	3
4	Maintenance.....	4
5	Typical Installation procedure.....	4
6	Sensor connection.....	5
6.1	CLOG500 supplied with external cable	6
7	Placing the CLOG500	6
7.1	Attaching the CLOG500	6
7.1.1	Using glue to attach.....	7
7.1.2	Using cable ties to attach.....	9
7.2	Possible scenarios.....	10
8	Equipment activation	11
8.1	Passing the magnet to activate	11
8.2	Visual Indicators	11
8.3	Equipment information	13
9	CLOG500 configuration.....	13
9.1	Sensor types and input numbers.....	13
9.1.1	Sensors connect through radio device.....	14
10	Tips and Tricks	14

1 General Information

The **CLOG500** is a multi-purpose autonomous (GSM/CDMA/GPRS based, battery powered) remote management system providing data logging, automatic meter reading and alarms, certified to be used under potential explosive atmospheres.

Collected and stored data is sent to a central server via GSM, through SMS or TCP, with a configurable frequency from several times a day to one time per week. This data can be requested by any cell phone using SMS.

The system's supply is obtained through a long life lithium battery which guarantees great autonomy and easiness in installation.

1.1 CLOG500 Model Numbering

aaC5_xyz				
aa	EX = Equipment for Hazardous location (Certified for ATEX, IECEx, USA and Canada)			Blank = Generic use equipment
xx ¹	00 = 3 Inputs (software selectable from analogue or digital)			
	10 = 2 analog inputs			
	11 = 1 analog input and 1 digital input			
	20 = 2 Analog Inputs			
	30 = 3 Digital Inputs			
	40 = 1 analog Input and 1 digital input			
	90 = 1 current (0-20mA) input. ²			
Y ³	0 = No modem	3 = 2G Modem	4 = CDMA 1xRTT modem	7 = 2G + GPS modem
z	0 = No ISM Band Transceiver		1 = with ISM Band transceiver	

¹ Check the safety manual for input parameters.

² This model does not have hazardous location.

2 FCC PART 15 compliance

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

You may also find helpful the following booklet, prepared by the FCC: "How to Identify and Resolve Radio-TV Interference Problems." This booklet is available from the U.S. Government Printing Office, Washington D.C. 20402.

WARNING: Changes and Modifications not expressly approved by the manufacturer or registrant of this equipment can void your authority to operate this equipment under Federal Communications Commission's rules.

2.1 RF Exposure Information

This device meets government's requirements for exposure to radio waves.

This device is designed and manufactured not to exceed the emission limits for exposure to radio frequency (RF) energy set by the Federal Communications Commission of U.S. Government.

The device complies with FCC radiation limits set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposures limits, human proximity to the antenna shall not be less than 20cm (8 inches) during normal operation.

3 Warnings

PLEASE READ CAREFULLY BEFORE ANY MANIPULATION OF THE EQUIPMENT.



Reading of this manual and safety manual is mandatory prior to any manipulation of the equipment. Failure to comply with presented safety instructions may lead to severe damage or injury and loss of liability by the manufacturer.



These instructions must be kept and followed throughout the life of the equipment.



Never open the equipment when a potential explosive atmosphere may be present.



POTENTIAL ELECTROSTATIC CHARGING HAZARD. CLEAN ONLY WITH DAMP CLOTHS.



Only use approved batteries.

Check other warnings in this manual (always marked with .

4 Maintenance



The equipment will have no maintenance inside the safety zone. The maintenance possible to perform on the field is just the batteries exchange and SIM Card replacement. For others problems the equipment must be returned to manufacturer.

5 Typical Installation procedure

This procedure is valid for versions that contain a GSM or CDMA modem.

For version that only contains the ISM Band transceiver the only necessary steps are the sensor connection, equipment placement and activation.

- 1) Connect the sensor to the **CLOG500** (see section 6). Some models may already have this connection.
- 2) Position the equipment next to the target (gas tank gauge, pulse meter, etc) and attach it using the base of the equipment (see section 7).
- 3) Attach the sensor to the target.
- 4) Prepare the SMS to send to the equipment (see section **Error! Reference source not found.**).
- 5) Activate the **CLOG500**, passing the magnet in order to prepare it to receive the SMS configuration (see section 8.1). In some models it may be possible that you need to operate the ON/OFF switch in order to activate the **CLOG500** (see section 8).
 - a) Check if a red LED starts to flash inside the **CLOG500**.
 - b) After 2 minutes a green LED should turn ON and, after 30 seconds, start to flash.
This means that the modem is already registered on the GSM network (ready for the SMS).
- 6) Send the SMS to the **CLOG500** (see section **Error! Reference source not found.**).
- 7) Wait for the response from the **CLOG500** (see section **Error! Reference source not found.**).

- 8) Check if the values for the 'SQ:' and 'MEM:' are correct (see section **Error! Reference source not found.**).
- 9) Check if the value for the cabled channel is identical to the one shown by the respective sensor. A 4%~ 6% errors is admissible.
- 10) Take note of the installation data on a sheet (see section **Error! Reference source not found.**).
- 11) Take all the waste with you.
- 12) Congratulations, the installation is complete.

6 Sensor connection

The only external component connected to the equipment may be a Rochester6320S level sensor (max length= 3 m), or any sensor / digital switch which are compatible with the equipment.

The sensor must already have the correct plug to connect to the **CLOG500**. The sensor connector is illustrated in the following picture:



Figure 1 - Sensor connector location.

Attention: The sensor connector has a correct position for the cable insertion.



Figure 2 – CLOG500 with sensor connected.

6.1 **CLOG500** supplied with external cable

The equipment may be supplied with external cable for sensor connection. The connection between the equipment and the sensor should be made using a junction box.

Check Installation and safety manual for cable color code and safety parameters.

7 Placing the **CLOG500**

7.1 Attaching the **CLOG500**

The equipment should be attached to a solid surface (1m to 2m from the ground) with a vertical orientation (if possible) optimized for radio transmission and communication.

To attach the equipment, it is recommended to use glue to fix the enclosure to the tank or use cable ties. The next Figure shows an example of how to correctly attach the **CLOG500** to a gas tank hook with cable ties or glue.



Figure 3 – Example of correct attaching on a gas tank hook with cable ties or glue.

Some provided or recommended accessories:



Figure 4 - Cable ties.



Figure 5 - Wurth MS Instant (Ref: 0893226100)



Figure 6 –C leaner product - Wurth
Brake Cleaner (Ref: 08901087)

7.1.1 Using glue to attach

1. In case of fixation by glue, the user should clean the tank surface to remove dirt and degrease from the area where is going to apply glue:

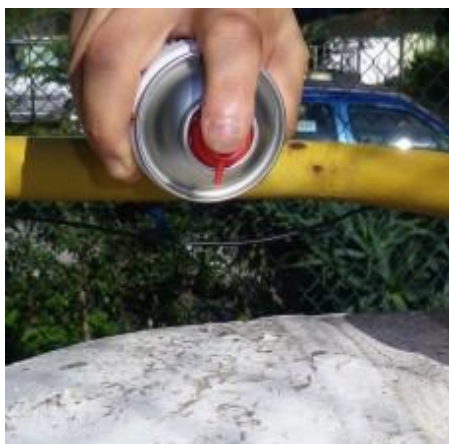


Figure 7 - Cleaning the tank surface before applying glue.

2. Next, apply glue to the base that is going to be fixed in the tank and attach to the tank. Apply sufficient glue to provide a good fixation.



Figure 8 - Base fixation.

3. Remove any glue excess.
4. Wait some minutes to allow the glue to fix.
5. Hook the **CLOG500** in the base.



Figure 9 – CLOG500 in the final position.

7.1.2 Using cable ties to attach

1. Attach the base to a pipe or some other acceptable place using cable ties.



Figure 10 - Fixation of the base.

2. Hook the **CLOG500** in the base.



Figure 11 - Final position of **CLOG500**.

The **CLOG500** should be installed as indicated in the previous figure, vertical position and the sensor cable at the lowest side.

7.2 Possible scenarios

The installation attaching option should be based on tank type. Equipment should always be placed in a vertical position when possible.

The **CLOG500** must be conveniently placed on a solid area (not in places that can move or have mechanical shock, for example covers, doors or fences), safe from flooding and particular attention should be paid to installation in totally metallic boxes, due to the effect of the *Faraday* cage.

8 Equipment activation

8.1 Passing the magnet to activate

In order to activate the **CLOG500** the user must have a magnet. The location to wave the magnet over is illustrated in the following picture. In the **CLOG500** the magnet is on the opposite side from the sensor connection.



Figure 12 - Location to pass the magnet on the **CLOG500**.

8.2 Visual Indicators

The **CLOG500** has two LED lights that can be seen from the outside, visible on the bottom, if looking through the semi-transparent enclosure.



Figure 13 - Location of the red and green LED on the **CLOG500**.

Equipment that only have the ISM Transceiver will only have the RED LED.

Visual indicator	Status	Observations
Green (modem LED)	OFF	Modem OFF
	Always ON	Modem ON, waiting for GSM Network registration
	Flashing	Modem ON and registered on GSM Network, waiting for SMS
Red (system LED)	OFF	System on stand-by mode
	Flashing	System in Installation phase, accepts installation SMS
	Always ON	Error state

Table 1 - Visual Indicators description for equipment's with GSM / CDMA modem.

Visual indicator	Status	Observations
Red (system LED)	OFF	System on stand-by mode
	Flashing (Fast)	Equipment in installation phase, can respond to radio messages.
	On (Duration 2s)	Equipment transmitting a Radio message.
	Always ON	Error state

Table 2 - Visual Indicators description for equipment with only ISM Band Transceiver.

The **CLOG500** only accepts the installation SMS if both red and green LEDs are flashing. If the equipment receives an installation SMS when the red LED is OFF, the equipment will respond with an SMS error.

It is advisable to only send messages to the equipment after the green LED is flashing; otherwise the SMS can take longer to be delivered to the equipment, delaying the installation procedure.

8.3 Equipment information

Equipment information, such as SIMCard phone number, IMEI, serial number, Radio ID and product reference can be found in metallic labels at the bottom of the equipment. The equipment has a bar code (QR Code) that can be read with most mobile phones with all such information.

9 **CLOG500** configuration

The **CLOG500** has physical inputs and wireless inputs (in some models) available to connect several sensor types. The sensor readings are associated with logic inputs (channels). The data associated to each channel is saved and sent later to a remote server, by SMS.

The configuration consists of associating each sensor (connected to a particular input) with a channel. This configuration is assured by sending a message (SMS installation) to the **CLOG500**, which sends back another SMS. This means that the installer cell phone number must be part of the SMS installation.

9.1 Sensor types and input numbers

Note that not all the inputs are available for all sensor types. There are differences between **CLOG500** models. The next table shows the possible combinations depending on the sensor type and on the **CLOG500** model.

CLOG500 Model	Sensor Type / Possible inputs (input number)*				
	R	D	E	M	N
	Voltage Data: 0~100%	Digital-Voltage Data: 0~1023	Voltage 0-5V Data: 0~1023	Digital - Impulses Data: 0 ~2^32	Digital – Input Data: 0 or 1

EXC5_00XY	SIG1 (1)	SIG1 (1) / SIG2(2)	SIG1 (1)	SIG1(1) / SIG2(2) / SIG(3)	SIG1(1) / SIG2(2) / SIG(3)
EXC5_10XY	SIG1 (1)	SIG1 (1) / SIG2(2)	--	--	--
EXC5_11XY	SIG1 (1)	SIG1 (1)	--	SIG2(2)	SIG2(2)
EXC5_20XY	SIG1 (1) / SIG (2)	SIG1 (1) / SIG (2)	SIG1 (1) / SIG (2)	--	--
EXC5_30XY	--	--	--	SIG1(1) / SIG2(2) / SIG(3)	SIG1(1) / SIG2(2) / SIG(3)
EXC5_40XY	SIG1 (1)	SIG1 (1)	--	--	--
(*) input number is the number to be used in the SMS installation (example for the input 2: CLOGI C1:2RC TEL:+351912345678).					

Table 3 – Possible sensor types on each **CLOG500**.

Note: In order to use input 3 “SIG(3)” in variant EXC5_00XY as Digital Input or Digital Impulses is necessary to place the Jumper S2 in the Open Position.

9.1.1 Sensors connect through radio device

For sensors connect via a radio device (RTU), the input number to put in the installation message is the “Radio ID:” field presented in the technical label of the radio device. This number can have any value from 10 to 65530.

10 Tips and Tricks

Here are some useful tips and tricks for **CLOG500** installer:

- For level sensors use channel 1 to 2 because the **CLOG500** sends instant data to these channels. Instant data is very useful for level sensors.
- Always configure cabled sensor on channel 1 and wireless sensor on channel 2 (wireless sensors are available only on some **CLOG500** models).
- When passing the magnet to activate equipment, rub it 3 or 4 times.
- The PIN code of the SIMCard should be deactivated or changed to the PIN code provided by ISA.

- Enable your SMS report on the installer cell phone in order to get feedback from the SMS (delivery report).
- The **CLOG500** has a limit to the number of SMS (for each type of SMS) it can send each day. In case the limit is reached, the installer can reset the counter in order to receive an SMS from the **CLOG500**. To reset the daily SMS counter, send the following SMS:

CLOGM01000000PP0000000

- To uninstall a sensor from a channel, send an installation SMS with one dash instead of input number and another dash instead the sensor type. For instance:

CLOGI C1:-- TEL:+351912345678

Troubleshooting

Problem	Diagnostic/Solution
If you receive a SMS starting with ???Mxx, an error has occurred on the configuration SMS. The error code is indicated by xx: 01 – Unknown message 02 – Error on the control code 03 – Message length error 04 – Invalid arguments 05 – Message not processed 06 – Installation message out of installation period	01 – Verify the installation message and try sending the SMS again. 02 – The control code is incorrect. Verify the control code and try sending the SMS again. 03 – Installation SMS is incorrect; verify the arguments and try sending the SMS again. 04 – Correct the arguments in the installation SMS and try sending the SMS again. 05 – Installation SMS is incorrect; verify the arguments and try sending the SMS again. 06 – The configuration time exceeded. Repeat the installation procedure.
You don't receive an SMS back	Check if green LED is blinking, if yes:

and you don't receive the delivery report.	• Erroneous telephone number: Verify the phone number on the equipment and compare it with the number used to send the installation message. If the number is incorrect, please repeat the installation procedure. • Damaged equipment: If the phone number is correct, please change the equipment and repeat the installation procedure. • GSM Signal is too weak: Change the location of the equipment and try again. If the problem persists again, don't install equipment in that location.
You don't receive an SMS back but you receive the delivery report.	• Erroneous telephone number: Verify the phone number on the equipment and compare it with the number used to send the installation SMS. If the number is incorrect, please repeat the installation procedure. • Damaged equipment: If the phone number is correct, please change the equipment and repeat the installation procedure. • GSM Signal is too weak: Change the location of the equipment and try again. If the problem persists again, don't install equipment in that location. • Daily SMS counter by type of SMS reached the limit (10 by default). Send an CLOGM type SMS to reset the counter (see tips section 10).
A channel was incorrectly configured – I'd like to uninstall it.	• Send an installation SMS with one dash instead of input number and one dash instead the sensor type. For instance: CLOGI C1:1RC C2:-- TEL:+351912345678

Table 4 – Troubleshooting.