atim cloud wireless™
PRODUCT LINE

ATIM Cloud Wireless

Analog sensor reading
DINDA

User Guide

Concerned models:

ACW/LW8-DINDA

ACW/SF8-DINDA

LoRaWAN™

sigfox ready

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Document version history

Version	Date	Description	Author
1.2	25/05/2016	Creation of the ACW DINDA User Guide	YL
1.3	22/11/2016	DIN casing	AM
1.4	09/03/2017	Corrections	FR
1.5	03/04/2020	Logic level digital inputs correction	SC
1.6	23/02/2021	Precision/resolution	ER

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Trademarks and copyright

Declaration of compliance

All ACW Atim Cloud Wireless® products comply with the regulatory requirements of the R&TTE Directive (1999/5/EC), article 3:

1 SAFETY (Article 3.1a of the 1999/5/EC Directive)

NF EN60950-1 Ed. 2006/A1:2010/A11:2009/A12:2011 (health)

EN62479: 2010 (power <20mW) or EN62311:2008 (power > 20mW)

2 Electromagnetic compatibility (Article 3.1b of the 1999/5/EC Directive)

EN 301489-3 v1.4.1, EN 301489-1 V1.9.2

3 Efficient use of the radio frequency spectrum (Art.3.2 of the 1999/5/EC Directive)

ETSI EN300 220-2 v2.4.1 and EN300 220-1 v2.4.1

Environmental recommendations

Explosive atmosphere

Except for the ACW-ATEX line specifically intended for this purpose, do not use ACW radio modems in the presence of flammable gases or fumes. Using the equipment in such an environment constitutes a safety hazard.

Environment

Respect the temperature ranges for storage and operation of all products. Failing to respect these guidelines could disrupt device operation or damage the equipment. ACW products in IP65 water- and dust-resistant housings may be placed outdoors, but must not, under any circumstances, be submerged.

Follow the instructions and warnings provided below to ensure your own safety and that of the environment and to protect your device from any potential damage.

General hazard *– Failure to follow the instructions presents a risk of equipment damage.*

Electrical hazard *– Failure to follow the instructions presents a risk of electrocution and physical injury.*

Direct-current symbol

WARNING*: do not install this equipment near any source of heat or any source of humidity.*

WARNING*: for your safety, it is essential that this equipment be switched off and disconnected from mains power before carrying out any technical operation on it.*

WARNING*: the safe operation of this product is ensured only when it is operated in accordance with its intended use. Maintenance may only be performed by qualified personnel.*

Waste disposal by users in private households within the European Union. This symbol appears on a product or its packaging to indicate that the product may not be discarded with another household waste. Rather, it is your responsibility to dispose of this product by bringing it to a designated collection point for the recycling of electrical and electronic devices. Collection and recycling waste separately at the time you dispose of it helps to conserve natural resources and ensure a recycling process that respects human health and the environment. For more information on the recycling centre closest to your home, contact your closest local government office, your local waste management service or the business from which you purchased the product.

Radio

Modems in the ACW line are radio-communication modems that use the ISM (industrial, scientific and medical) bands, which may be used freely (at no cost and with no authorisation required) for industrial, scientific and medical applications.

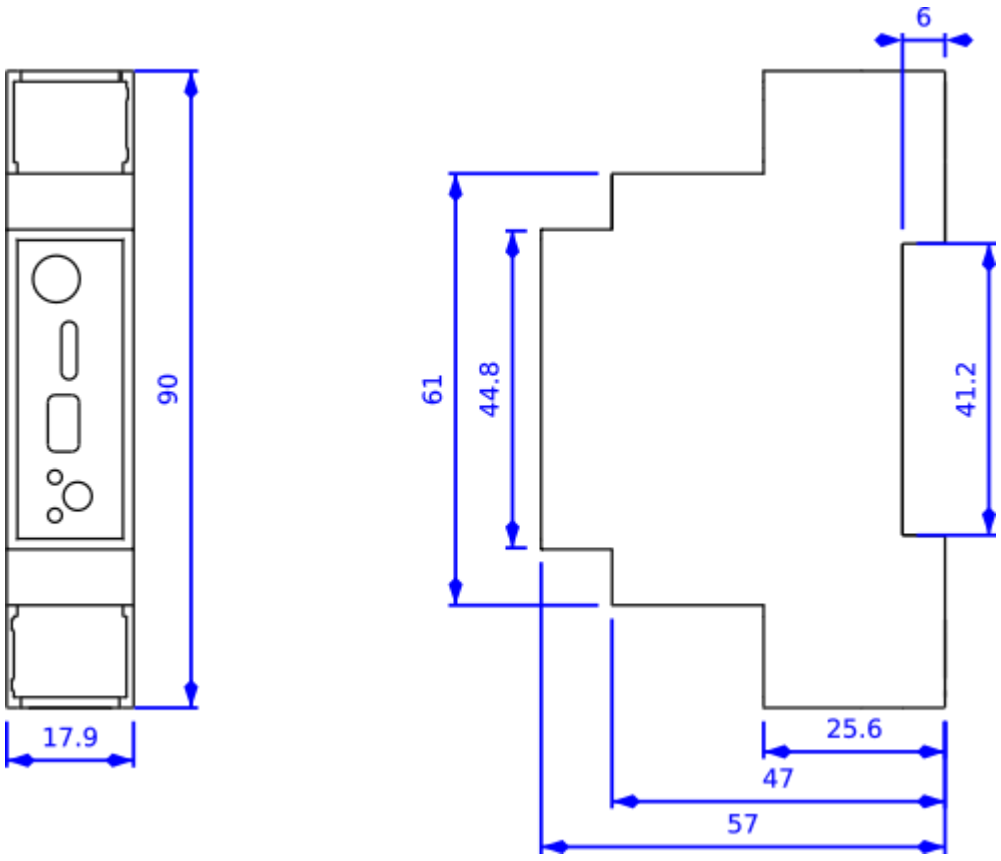
Technical specifications

Dimensions	90 x 57 x 67 mm	
Antenna	External (SMA connector)	
Temperature	-20°C to +55°C (operating) -40°C to +70°C (storage)	
Mounts to	DIN-Rail	
Power Supply	1 x alimentation 10-30Vcc	
Frequency	865 – 870 MHz	
Power	25 mW (14 dBm)	
Rate	Sigfox: 100 bps LoRaWan: 300 bit/s à 10 Kbit/s	
Consumption	Sigfox	LoRaWan
Mode Tx	40 mA	35 mA
Mode Rx	35 mA	20 mA
Standby Mode	10 mA	10 mA

Mesurement

	Current	**Precision**	**Resolution**
	4 mA	3%	12 bits
	8 mA	1,50%	
	12 mA	0,75%	
	16 mA	0,40%	
	20 mA	0,20%	

Footprint and installation



Dimensions given in mm.

ACW modems in ‘breaker’ format are attached to a DIN-rail.

Set up

a. Positioning

Install the modem at a minimum height of 2m and not glued to a wall, ideally offset by at least 20cm.

For best results, it is advisable to move the antenna up and clear of any metal obstacle within a radius of 1 meter if possible.

b. Modem connection

Terminals:

Name	Designation	Input / Output
GND	Ground	Input (alimentation)
10/30V	Power supply between 10V and 30V	Ground
OUT	Sensor power supply	Dry contact output 10/30V (1A)
AN	Analogic input	Input 0/10V | 4/20mA
IN2	Digital input 2	Dry contact input 10/30V
IN1	Digital input 1	Dry contact input 10/30V

Antenna (SMA):

Before powering the product, a 50Ω / 868MHz antenna must be connected, either directly to the SMA connector or via a 50Ω cable in case of antenna offset.

Alimentation device (Lower terminal):

The ACW-GW module must be powered with a DC power supply between 10V and 30V that can provide a minimum current of 100mA.

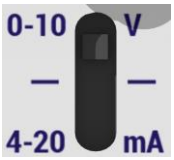
Alimentation analogical sensor (Lower terminal):

The analog sensor can be powered at the time of measurement directly with the output OUT of the ACW_DA. To do this connect its power supply to the pin "OUT" and its GND to that of the external power supply (or terminal GND). This output can deliver a max current of 1 ampere with the supply voltage (10 / 30V). Before each analog measurement, the sensor will be powered for 0.5 seconds. If you want to permanently supply the sensor, do not use the "OUT" connector and connect it directly to the terminals of the external power supply.

Analogical input (Upper terminal):

It is the analog input current or voltage that comes from the sensor.

To choose a voltage or current reading, in addition to indicating it in the configurator (see Modem configuration section), it is necessary to switch the slide switch to the correct position. For use with a 0-10V sensor, it is necessary to switch the switch to the high position (SMA side). For a use with a sensor 4-20mA, it will switch the switch down (USB side).



Numerical inputs (Upper terminal):

You can connect up to two digital inputs. It is necessary to inject a voltage between 10 and 30V continous or to leave the circuit open.

USB:

The USB connector is used to configure the ACW via a PC and a USB cable. for more detail. The configuration must be done with the device powered by 10 / 30V.

c. Lights meaning

When the power is turned on or after removing the USB cable, the green LED (upper LED) lights up for a brief moment signifies that the ACW is starting up properly. If a problem occurs during this phase, the red LED (bottom LED) will illuminate for a brief moment to testify to this state.

In USB configuration mode, the green LED flashes until the configuration is completed and the USB cable is removed.

Overall, in normal operation, the illumination of the green LED attests to a radio communication. The red LED illuminates to show any errors that may occur.

d. Pushbutton

The push button, located on the front of the box, allows to emit a test frame to validate the installation on site. A test frame is constituted as follows.

Formatting frames' for more details):

Octet :	1	2
Data :	0x05	Metering

Note

The value ‘Counter’ is incremented with each press.

e. 10/30V digital inputs

The digital inputs IN1 and IN2 have the following function:

Either trigger the analogue measurement on each rising or falling edge, then send the measured value to the radio (Sigfox / LoRaWAN).
These inputs must be controlled by a voltage between 10V and 30V for an active state. The consumption of these inputs is 30mA max at 30V and 10mA max at 10V.

Modem configuration

Download and install the configuration software '' setupACW.exe '' at:
http://www.atim.com/produit/atim-cloud-wireless-acw/

Connect the module to your computer with a USB cable then launch the software, do not forget to supply the ACW_RS in 10 / 30V.

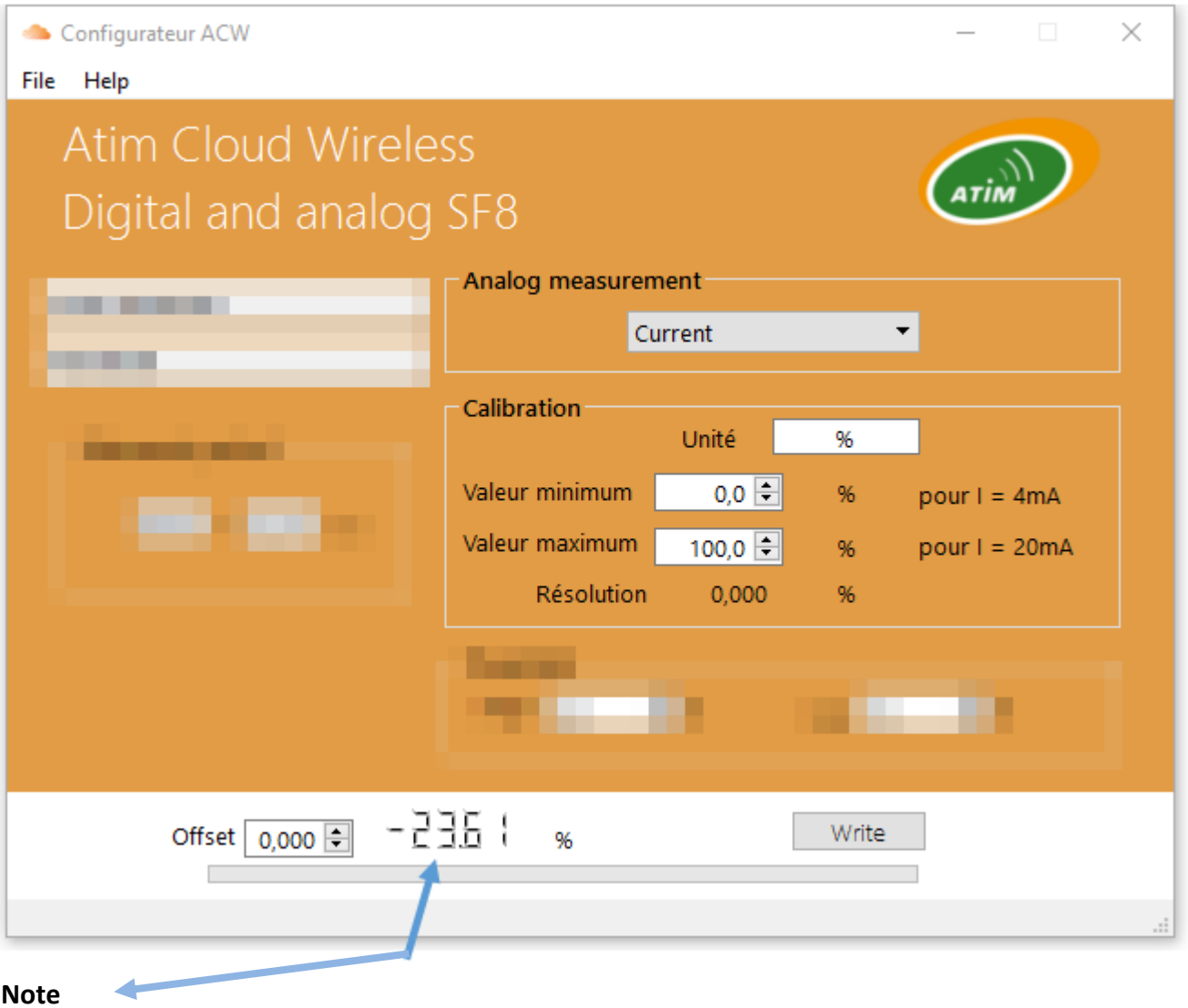
When you connect the module, the software window changes to allow you to access the main features. Automatically, the current configuration of the connected module is retrieved and displayed.

The different configuration modes are described below. Once the configuration is the one you want, you must click on the **Write** key. After a few seconds of waiting, a message appears next to it to inform you if the module update succeeded or failed.

Note
It is in this phase that the module is updated with the time of your PC.

Once the configuration is complete, do not leave the module connected to USB. This mode of operation is very energy intensive. When you remove the USB link without disconnecting the battery, the module automatically returns to normal operation. At power up, 5 test frames are emitted every minute to validate the operation.

a. Common configuration (calibration)



Note

In the lower part, you can read in real time (periodic sampling of 2s) the value measured by the module.

- ✓ Analog measurement

  Here you can choose the type of measured value (current or voltage). You must also make this choice on the slide switch (see Set Up).

- ✓ Calibration

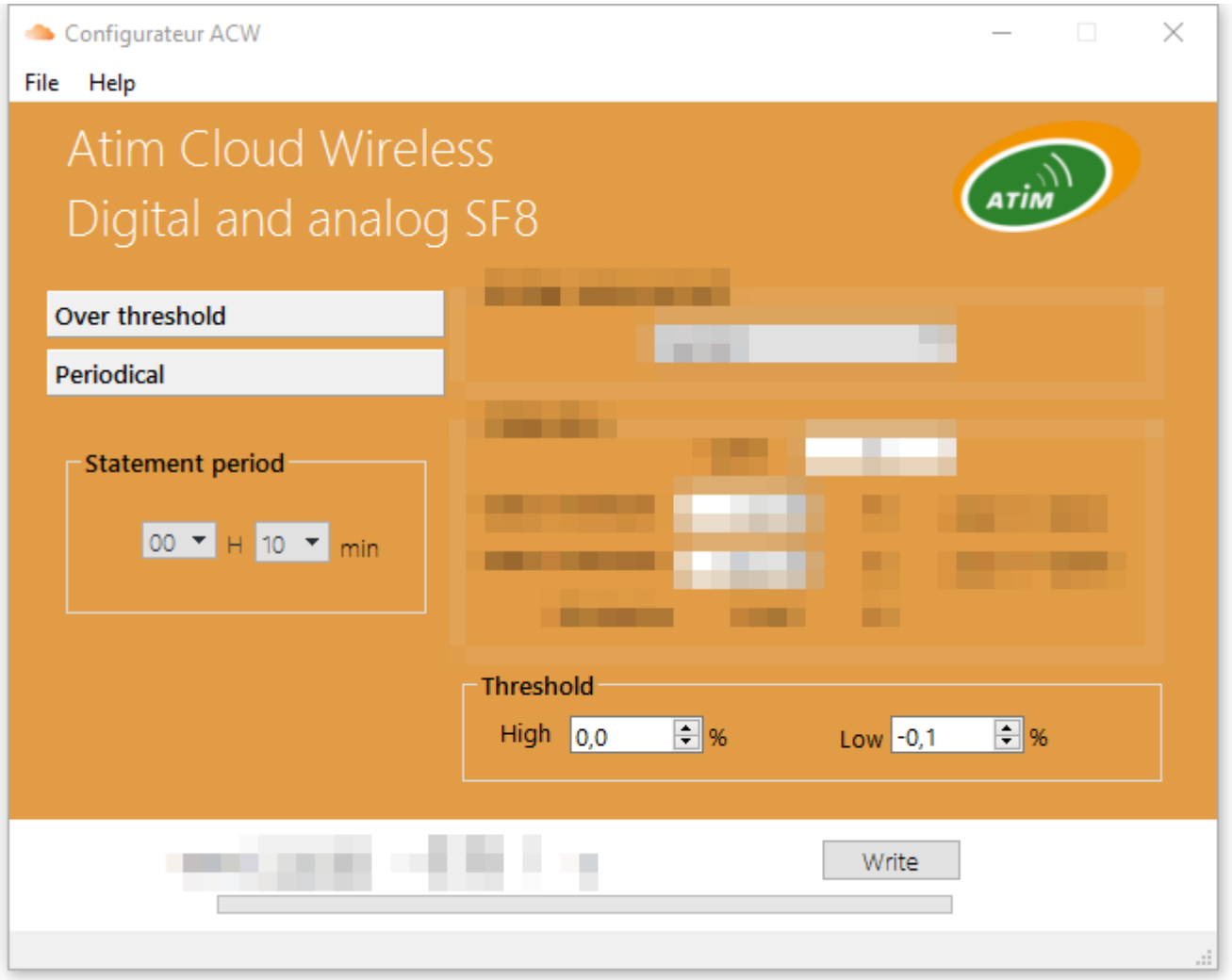
  The 'Unit' field allows you to specify the unit of measure for data readability, up to 4 characters long. The 'minimum value' allows to set the minimum value for a sensor output of 0V or 4mA. The 'maximum value' is used to set the maximum value for a sensor output of 10V or 20mA.

- ✓ Offset

  Offset correction of the sensor + module assembly. Enter the value to add or subtract to the measure to get the correct value. It is not recommended to correct the offset for an input of 0V or 0mA.

b. Periodic mode configuration (SF8/LoRaWAN)

In this mode of operation, an analog measurement is performed and sent in radio every X time (X is a configurable value).

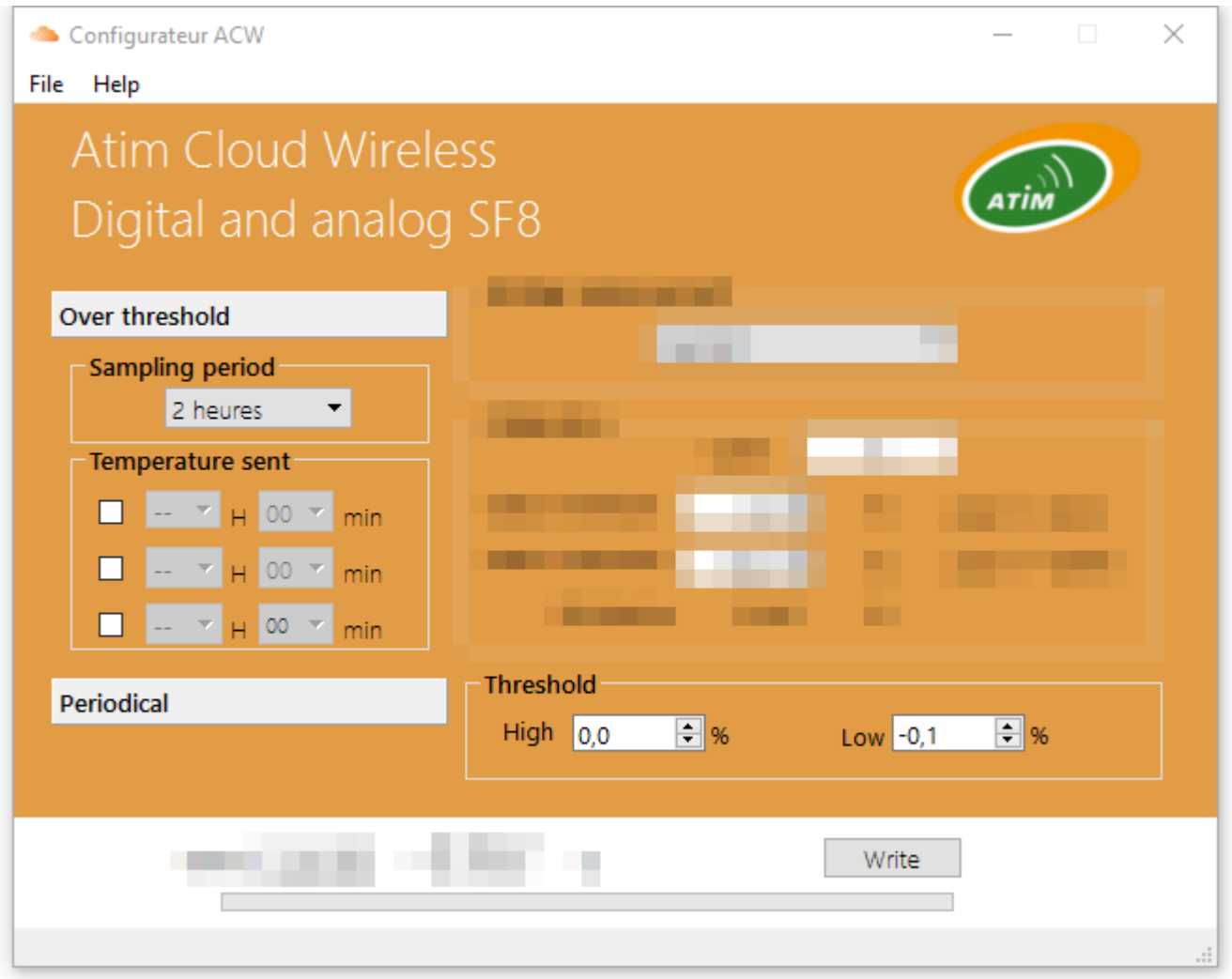


- ✓ Statement period
  This menu allows you to configure the elapsed time between 2 sending of data. This period is between 10min and 23h50min with a step of 10min.

- ✓ Threshold
  The high and low thresholds are not used in this mode, but they are still transmitted by radio. Depending on your needs you can choose to configure them.

c. Threshold mode configuration (SF8/LoRaWAN)

In this operating mode, an analog measurement is performed every X time (X is a configurable value). In the case where the measured value is not between the two thresholds (configurable) the value will be transmitted in radio.



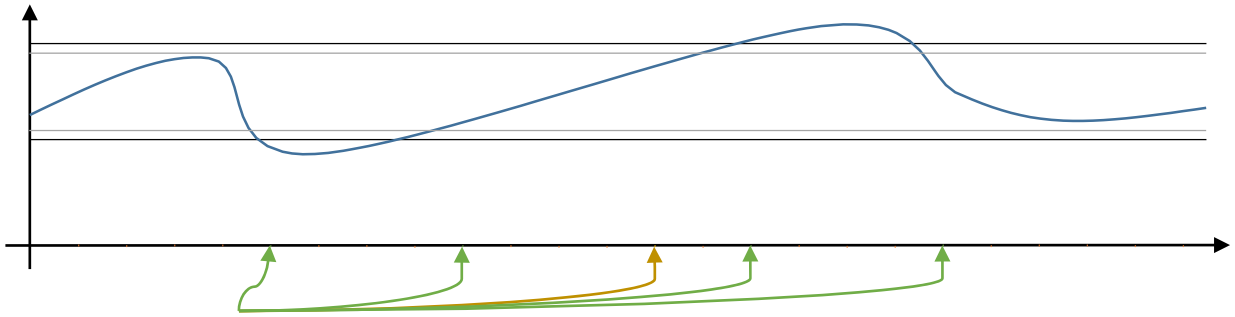
- ✓ Sampling period
  This menu allows you to configure the elapsed time between 2 analog acquisitions. This period is configurable every 15min, 30min, 1 hour or 2 hours.
- ✓ Temperature sent
  This makes it possible to force the sending every X time. Three times are configurable. To activate and configure them you must check the appropriate boxes.
- ✓ Threshold
  During a measurement, it is compared with the high 'High' and 'Low' low thresholds. If the measurement is outside these thresholds, the value will be sent only if the previous measured value was between these two thresholds.

Note

When a threshold is reached, it changes value, 5% greater for the low threshold and 5% smaller for the high threshold. 5% of the range of measurement. For example, if the min value is -2 and the max value is 14, Se will be 5% of 16

Operating example

In this example the 'Sampling period' is set every hour and only one 'temperature sent' is set to 13h. The min value is 0 and the max value is 10. The threshold values could be 5V and 8V (black curve). This means that if the measured value is outside thresholds (5V and 8V), the thresholds will be changed to 5% and will become 5.5V and 7.5V (curve in gray).



The blue curve corresponds to the measured analog signal. The orange curves correspond to the analog measurements. The green curves represent the sending of the measured analog value which has just crossed a threshold. The yellow curve represents the sending of the measured analog value when the 'temperature feels' is reached.

Frames formatting

The first byte is a header, it defines the following data present in the frame. The useful elements therefore vary according to the type of frame sent. The frames to the ACW-DA modem are :

TYPE	DESCR.	FORMAT DE LA TRAME											
		octet 0 (dec)	octet 0 (hex)	octet 1 (hex)	octet 2 (hex)	octet 3 (hex)	octet 4 (hex)	octet 5 (hex)	octet 6 (hex)	octet 7 (hex)	octet 8 (hex)	octet 9 (hex)	octet 10 (hex)	octet 11 (hex)
KEEP ALIVE	Trame de vie	1	01	Supply voltage IDLE (mV)		Supply voltage TX (mV)		64						
VOLTAGE READING	Trame de relevé périodique d'une valeur 0-10V	24	18	**Logic level digital inputs**	Voltage value		Value min		Value max		**Unité**			
CURRENT READING	Trame de relevé périodique d'une valeur 0-20mA	25	19	**Logic level digital inputs**	Current value		Value min		Value max		**Unité**			
VOLTAGE ALERT TRESHOLD LOW	Trame d'alerte BAS d'une valeur 0-10V	30	1E	**Logic level digital inputs**	Voltage value		Value min		Value max		**Unité**			
CURRENT ALERT TRESHOLD LOW	Trame d'alerte BAS d'une valeur 4-20mA	34	22	**Logic level digital inputs**	Courent value		Value min		Value max		**Unité**			
VOLTAGE END ALERT TRESHOLD LOW	Trame de fin d'alerte BAS d'une valeur 0-10V	31	1F	**Logic level digital inputs**	Voltage value		Value min		Value max		**Unité**			
CURRENT END ALERT TRESHOLD LOW	Trame de fin d'alerte BAS d'une valeur 4-20mA	35	23	**Logic level digital inputs**	Courent value		Value min		Value max		**Unité**			
VOLTAGE ALERT TRESHOLD HIGH	Trame d'alerte HAUT d'une valeur 0-10V	32	20	**Logic level digital inputs**	Voltage value		Value min		Value max		**Unité**			
CURRENT ALERT TRESHOLD HIGH	Trame d'alerte HAUT d'une valeur 4-20mA	36	24	**Logic level digital inputs**	Courent value		Value min		Value max		**Unité**			
VOLTAGE END ALERT TRESHOLD HIGH	Trame defin d'alerte HAUT d'une valeur 0-10V	33	21	**Logic level digital inputs**	Voltage value		Value min		Value max		**Unité**			
CURRENT END ALERT TRESHOLD HIGH	Trame de fin d'alerte HAUT d'une valeur 4-20mA	37	25	**Logic level digital inputs**	Courent value		Value min		Value max		**Unité**			
TEST	Trame de test	5	05	CNTR										

The data is decoded as follows:

Logic level digital inputs	Bit	7	6	5	4	3	2	1	0
	Octet 1	NC	NC	Input 1	Input 2	NC	NC	NC	NC
Voltage Value	Octets 2 & 3	V(V) = VOLTAGE * ((10-0) / 64240)							
Current Value	Octets 2 & 3	C(mA) = CURRENT * (20-4)/47584							

Example of a received frame

(hex) 1920C4510000FFFF00000000

'Frame type' = (hex)19 = 25=> 'Index periodic frame'

'Logic level CUT' = (hex)20 => 'Input 1 at "1" and Input 2 at "0" '.

'Voltage value' = (hex)C451 => 'Measured tension value' = 0xC451 = (dec)50257 => 50257 * ((10-0) / 64240) => 7,8 V

Help

The modem is not configured via USB or the configurator page does not update

- Check if the power supply is properly connected to the modem
- Check if the light is flashing
- Check that "Windows Update" is enabled, that the PC is connected to the Internet and that the driver installation is complete. Also check that your version of the configurator is up to date (Menu File -> Update).
- Replace the USB cable
- In case of Failed to write the configuration, unplug and reconnect the USB cable

Radio data is not received

- Check if the power supply is properly connected to the modem
- Check if the modem has been registered on the network
- Check if radio network coverage is available

Modem LED does not flash

- Check if the power supply is properly connected to the modem
- Configure the modem using the USB configurator

Technical Support

For any information or technical problems, you can contact our technical support:

https://www.atim.com/en/technical-support/