



Power Consumption Estimation

A) b-1072z-1rwan

Trasmitting/Receiving Mode > consumption of Tx (38mA) and Rx (11mA)

Sleep Mode consumption 1mA (down to about 4 uA with right settings)

B) Arduino uno blackboard

With the last innovations **power consumption** of the **Arduino** Uno is reduced by 88.37% from 98.43mA to 11.45mA.

Using on-board circuit changes, selective replacement of components and the use of microcontroller sleep mode can reduce the continuous idle power usage of an Arduino UNO to only **5%** of the default draw (6 micro ampere).

C) LED

Consumption is 2mA

D) Small Solar Panel 55x70mm 0.5W.

Typical current: 100mA, Typical voltage: 5.5V

E) Lithium Ion Battery - 400mAh

F) ILS - Due bit tre vie

Elettrovalvola valvola controllo
elettronico Piccolo scarico valvola
sfiato DC 5V DC6V

The nominal current: <60mA

The nominal power : 0.4-0.7W

Pression: 0-350mmHg

Velocità: <3S (100cc from 300mmHg to 15mmHg time)

G)

DC 3-12V Mini autoadescente Pompa ad ingranaggi Pompa di pompaggio ad acqua Pompa elettrica con motore RS-360SH,

Current 5 V - 2 A (indication not precise)

Pump motori s RS-360SH . Maximum raise 1,5 meters.

H)

AS7265x Spectrometer

UV Led 20 mA

IR LED 20 mA

White LED 30-60 mA

Operating current 5mA

Performances

1) Full Sleep mode

The performance of the whole system in sleep mode is consumption of 4 micro ampere, plus 6 micro ampere. Total 10 uA.

1.0mAh can last about 400 hours with 400 mah battery. That means more than 16 days in sleep

mode. That is making the hypothesis that battery solar recharging has not taken place for this period.

2) Normal Monitoring mode

The performance of the whole system in normal mode, making the hypothesis of 6 daily water measurements (one every 4 hours) , and real time transmissions of data , also taking into consideration that we must enclose in this calculation 6 pump water loads, and 6 pump water drains, and also consumption of 10 LEDs for nocturne buoy visibility, is :

Consumption

6 x Tx (38mA) x 2 sec	2b-1072z-Irwan	
11.45mA x 24 hours	BlackBoard	Arduino
board		
6x2 x 20mA x 1 sec	2 LED	AS7265x
6x1 x 45mA x 1 sec	1 LED	AS7265x
5 mA x 24 hours	operating	current
AS7265x		

6 x 2A x 10 sec	pump loading water
6 x 60mA x 10 sec	pump drain water
10 x 2mA x 6/2 hours	Buoy Night Leds

Power (Watt) = voltage (volt) x current (Ampere)

Power (Watt) = 3.3 v x current (Ampere)

3.3 v x 6 x Tx (38mA) x 2 sec

3.3 v x 11.45mA x 1 minute approx

3.3 v x 6x2 x 20mA x 1 sec

3.3 v x 6x1 x 45mA x 1 sec

3.3 v x 5 mA x 1 minute approx

3.3 v x 6 x 2A x 10 sec

3.3 v x 6 x 60mA x 10 sec

3.3 v x 10 x 2mA x 6/2 hours

3600 sec x 24 = 86400 sec

1 sec = 1 day/ 86400 = 0.00001157407

1 sec = 1 hour/ 3600 = 0.000277777777

Daily consumption in normal mode

76 mA x 0.00001157407 = 0.00087962932
mAday

	0.00069444 mAday
240 mA x 0.00001157407 =	0.0027777768
mAday	
270 mA x 0.00001157407 =	0.003125 mAday
	0.03472221 mAday
	1.388888 mAday
	0.041666 mAday
	2.5 mAday

	0.397 A / day

That is total consumption of $3.3 \text{ v} \times 0.395 \text{ A} = 1.30$
watt / day

Capacity Planning

It seems that they will be necessary 4 solar panels
and 4 lithium ion battery for the actual normal
mode.