

Arquimedes

Fuel Control System

Presentation



Summarized Presentation

Logistics and Fuel Control now at your reach...

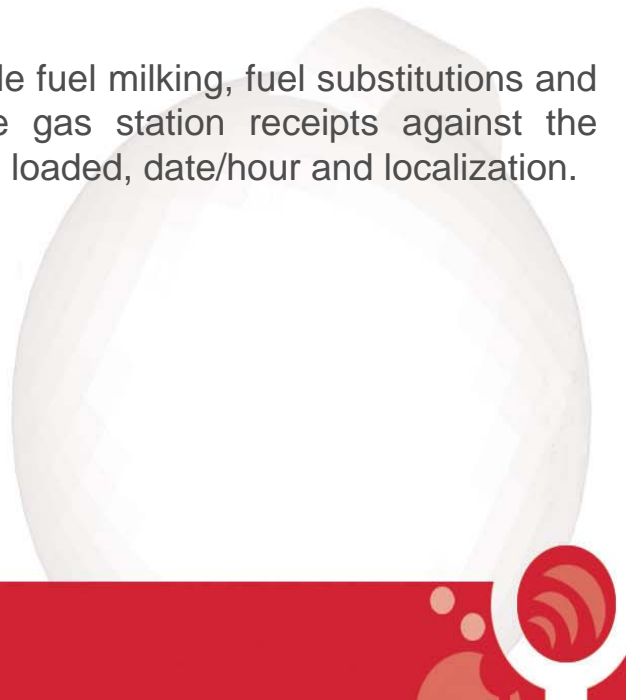
Arquimedes is an electronic system that measures the remaining fuel in each tank (up to 3 tanks) of a transport vehicle (tractor, truck, etc...) and monitor the vehicle status (parked, stopped motor on, moving).

A GPS receptor is connected to the system in order to indicate the vehicle's positions (latitud-longitud).

The above mentioned data is recorded every 90 seconds in the system's memory and can be downloaded to a PC or laptop.

Arquimedes will indicate the vehicle's consumption, its yield Kms/liter (when with GPS), litres/hour, detect the fuel refills and indicate precisely the vehicle's trip on digitalized maps.

The system will also detect the possible fuel milking, fuel substitutions and will permit a thorough check of the gas station receipts against the detected refills, comparing fuel volume loaded, date/hour and localization.





Arquimedes is an electronic fuel level control system

The system, discreetly installed inside the vehicle, will record every 90 seconds, 24 hours, 7 days a week, 365 days a year, the following data:

- 1.- The date hour and log number.
- 2.- The remaining fuel in each tank (up to 3 tanks) of a transport vehicle (tractor, truck, etc.).
- 3.- The vehicle's status (parked, stopped motor on, moving).
- 4.- The vehicle's position (latitud - longitud).





Arquimedes will indicate:

- The trip's refills
 - The quantity of fuel loaded in each tank for each refill.
 - Where and when each refill took place.
- The route travelled by the vehicle during the trip
 - The detailed distance travelled.
 - The route on detailed digital maps.
 - The places where the vehicle stopped
- The use of the motor during the trip
 - The time duration motor off and on, vehicle stopped and moving
- The events of the trip
 - The possible fuel milkings
 - The possible fuel substitutions

Arquimedes will calculate:

- The total fuel consumption
- The yield kilometers per litre
- The yield litres per hour





Description of the system installed in the vehicle

The control box (4 x 10 x 15.5 cms) is installed inside the dash board of the cabin.

For the measurement of the remaining fuel in tanks:

A fuel sender is installed in each tank in order to measure the amount of fuel in tank.

Each fuel sender is directly connected to the control box.

For the vehicle's status monitoring:

The control box is connected to:

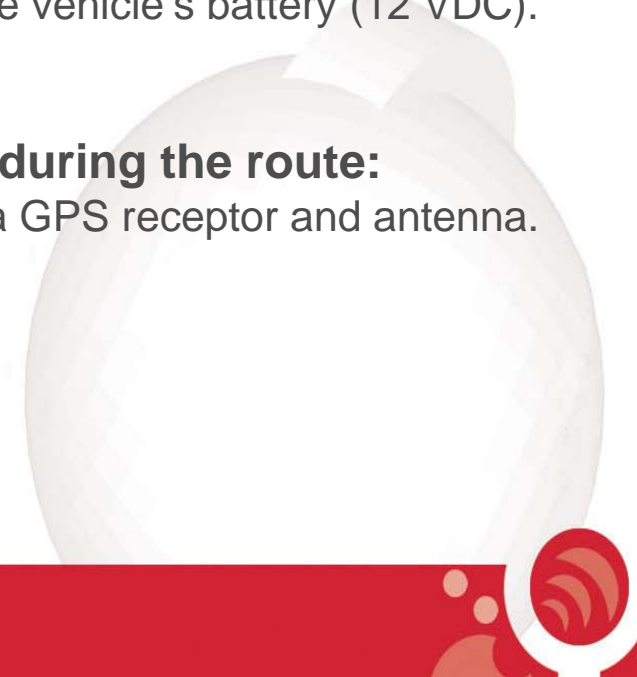
- Ignition Switch – To indicate if the ignition key is On or Off.
- Alternator excitation terminal – To indicate if the motor is On or Off.

For the system power source:

The control box is connected to the vehicle's battery (12 VDC).

For the vehicle's positions during the route:

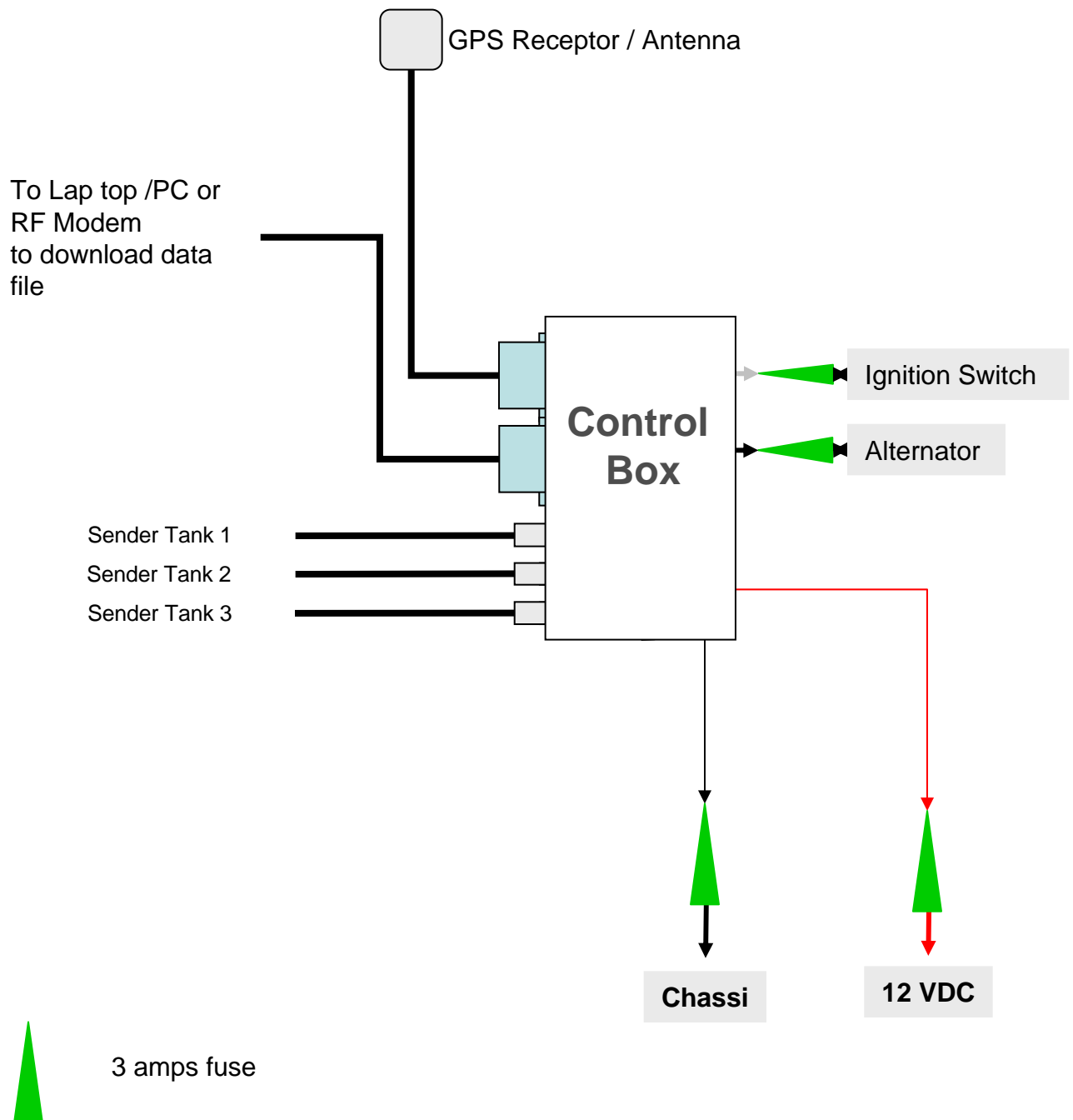
The control box is connected to a GPS receptor and antenna.





Arquimedes System Connections Schematic

The system do not interfere with electric or electronic systems already installed in the vehicle





Arquimedes System operations

Step 1 – Download data file

When the vehicle returns to base, the system is connected with a RS 232 conector to a Lap-top or PC and the data file in the system memory is downloaded.

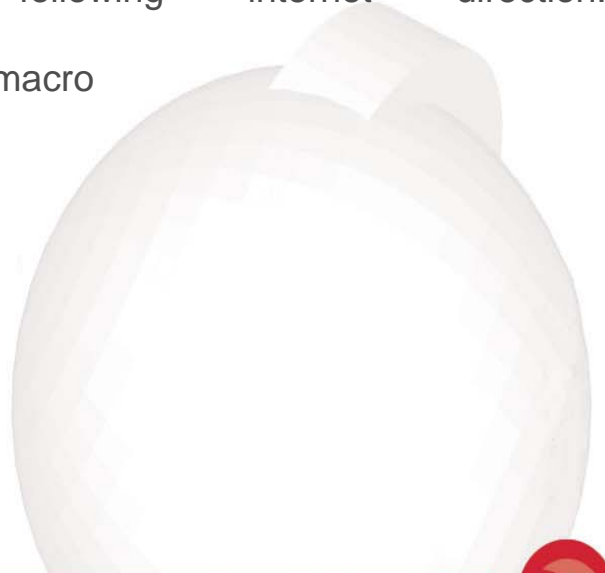
This operation is performed by a software called Route Collect. Once the data file is successfully downloaded, the system memory is erased to allow for the next trip data.

The system will keep in memory up to the last 20 consecutive days. Thereafter old data will be replaced by new data.

Step 2 – Data file analysis

The downloaded data file can be analyzed:

- Vía Internet at the following internet direction:
www.arquimedes.com.mx/anaweb/
- With Excel using the Anadatos.xls macro



Data file: presentation

RC-file-version: 1.06
 Hardware-version: 6
 Software-version: 6
 Serial-number: 60530020
 Max-consumption-rate-(litres/hr)-(Moving): 100
 Max-refueling-rate-(litres/hr)-(Moving): 6500
 Max-consumption-rate-(litres/hr)-(Stopped/Motor-on): 50
 Max-refueling-rate-(litres/hr)-(Stopped/Motor-on): 6500
 Max-consumption-rate-(litres/hr)-(Stopped/Motor-off): 20
 Max-refueling-rate-(litres/hr)-(Stopped/Motor-off): 6500

Technical data factory set-up

Company's-name: Blue StarTransports
 Vehicle's-make-and-model: Freightliner
 Vehicle's-year: 2006
 Vehicle's-economical-number: 134
 Vehicle's-registration-plate: na
 Odometer-reading-at-installation-(kms): na
 Installation-date-(dd/mm/yyyy): 25/03/2008
 Installation-technician-name: Arquimedes
 Number-of-tanks: 2
 Tank-1-capacity-(liters): 575
 Tank-2-capacity-(liters): 575
 Tank-3-capacity-(liters): 0
 Tank-3-type: (Indicate tank type and position)

Data captured during the system installation

Present-odometer-reading: 65201
 Last-trip-driver-name: John Stewart
 Last-trip-reference: n/a

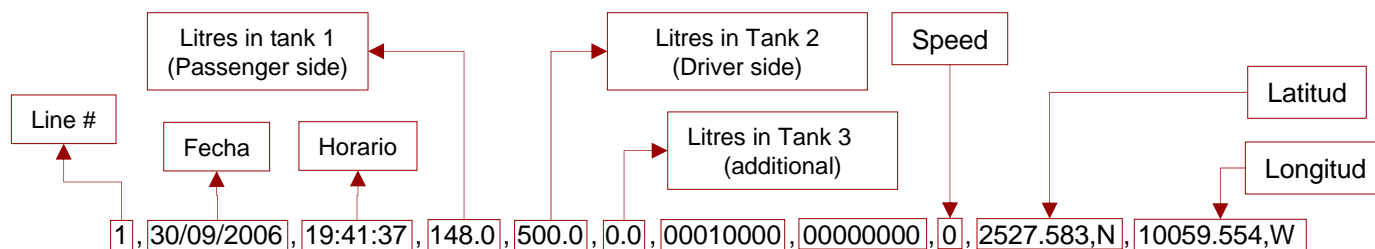
Data captured before each download

1,30/09/2006,19:41:37,148.0,500.0,0.0,00010000,00000000,0,2527.583,N,10059.554,W
 2,30/09/2006,19:43:07,148.0,499.8,0.0,00010000,00000000,0,2527.583,N,10059.554,W
 3,30/09/2006,19:44:38,148.0,499.8,0.0,01010000,00000000,0,2527.567,N,10059.546,W
 4,30/09/2006,19:46:08,148.0,499.8,0.0,01000000,00000000,0,2527.572,N,10059.547,W

Trip data

A line is recorded every 90 seconds.

The data in each line is comma separated and distributed as follow:



Vehicle's Status

First digit = Power source Off/On 10000000 - 00000000
 Second digit = Ignition On/Off 00000000 - 01000000
 Third digit = Control box Opened/Closed 00100000 - 00000000
 Fourth digit = Motor On/Off 00010000 - 00000000
 Fifth digit = Vehicle Moving/Stopped 00001000 - 00000000
 3 last digits always on 0

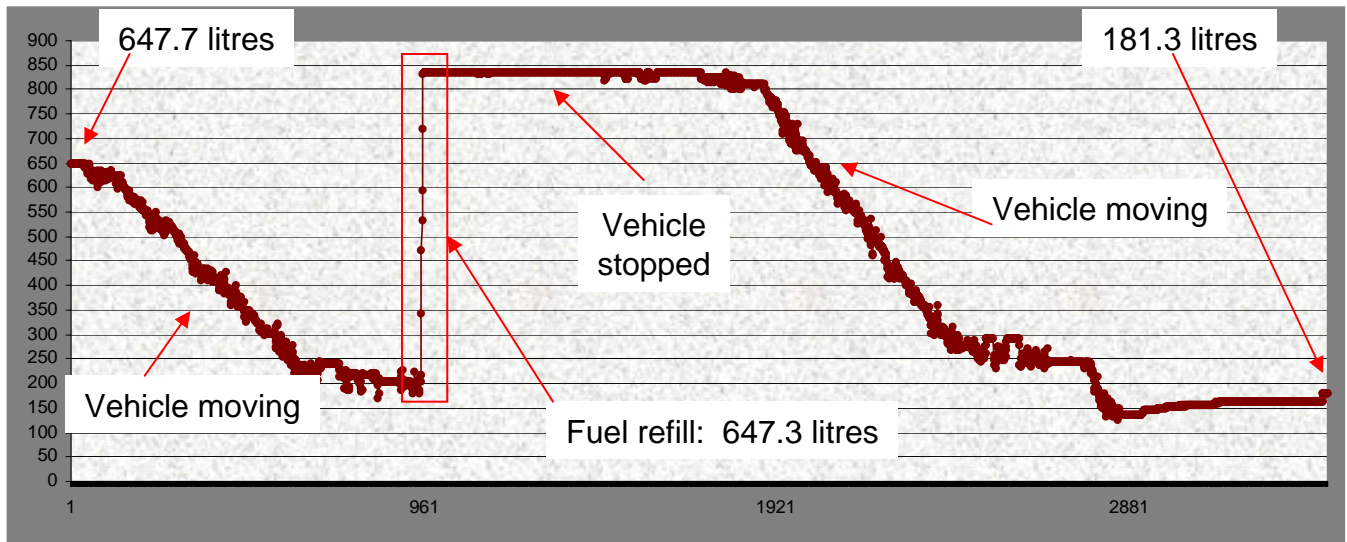
Tanks and GPS connection Status

First digit = T1 cut Yes/No 10000000 - 00000000
 Second digit = T2 cut Yes/No 01000000 - 00000000
 Third digit = T3 cut Yes/No 00100000 - 00000000
 Fourth digit = Fuel rate normal No/Si 00010000 - 00000000
 Fifth digit = GPS connected No/Yes 00001000 - 00000000
 3 last digits always on 0

Graphical visualization example of fuel in tanks during a trip.

Vehicle with 2 tanks

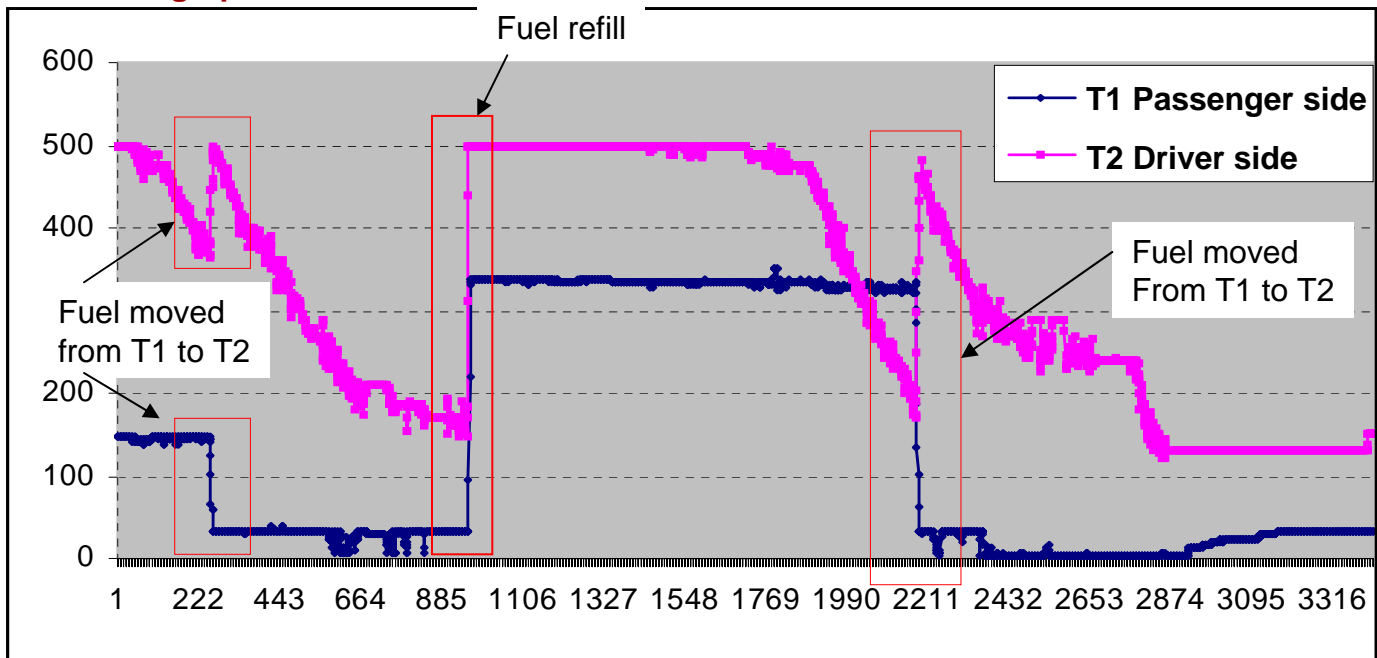
Total in tanks



960 logs = 24 hours

Vertical Axis: Litres Horizontal Axis: Time (n) of logs

Detailed graphs of each tank



T1 is inactive during the route, the fuel burned by the motor is supplied only by T2. The intertank communication key is only open when fuel is moved from T1 to T2 or when loading fuel.

Configurations

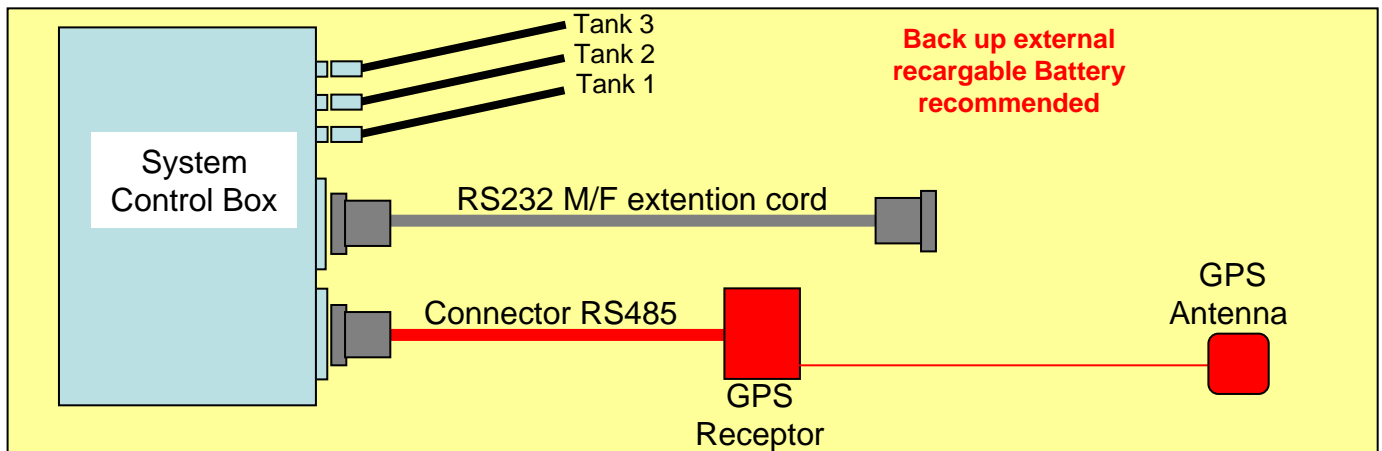
The Arquimedes system will allow the following configurations (one can migrate from one configuration to the other with the same control box):

Manual Download configuration

The data files are downloaded through a physical connection from the Arquimedes control box to the Lap top or PC using a RS 232 (M/F) extension cord.

The length of the RS232 extensión can go up to 12 metros (depending of the quality of the cable).

The GPS receptor is integrated to the basic configuration by connecting it to the RS 485 conector of the Arquimedes control box and by programming the GPS functions with Route Collect.



Wireless Download configuration

The GPS receptor is integrated to the wireless configuration by connecting it to the RS 485 conector of the Arquimedes control box and by programming the GPS functions with Route Collect.

