

JIGSAW

Real Time Fuel Management



BUS AND COACH

JIGSAW

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Our Mission ...

Jigsaw Fuel Management was established in 2007 specifically to develop a new generation of fuel management system. The developers had many years of experience designing what were at the time the best fuel management systems on the market.

The aim was to exploit the convergence of reliable Internet access and low cost, reliable mobile data communications to develop a fuel management system which had not been possible until this time.

The resulting system has changed the face of fuel management. Jigsaw now manage more than a Billion litres of fuel a year with sites not just in the UK, but across the globe.

Jigsaw strive to make the most reliable fuel island equipment anywhere. The terminals use switch mode power supplies to combat mains fluctuations, they are not based around PC's and they do not use membrane keypads to ensure long term reliability. The enclosure is fabricated in stainless steel so that it will stand up to the rigours of any environment.



Our Partners ...

Jigsaw have developed a network of distributors who not only understand how fuel management works in a PSV environment, but can also support your pumps and gauging equipment so that you can be confident that all work is carried out to the latest standards by professionals.

Jigsaw work with a range of suppliers to the Fuel Management Industry so that we don't just supply Fuel Control Terminals, but can also supply and advise on Tank Gauge Equipment, Flow Meters, Pumps, Solenoid Valves, Nozzles, Hoses and the rest of the equipment necessary to install and support a complete fuel management solution.

Our Customers :

Jigsaw supply fuel management systems to the bus and coach industry, with fleet sizes ranging from just a few vehicles to large multi-site fleets.

Customers range from Contract Coach companies, City wide bus fleets and even airport offsite parking companies.

Our Products ...

Jigsaw have developed solutions specific to the Bus and Coach Industry, especially for those fleets where a refuelling shift is employed. The Jigsaw system can automatically identify the vehicle being fuelled, and capture the mileage of the vehicle without any fueller input - increasing accuracy and speeding up the fuelling shift.

The **JIGSAW Fuel** Web Software has specific reports for the bus and coach industry as well as Vision TM Tiles showing relevant information such as a live view of all vehicles not yet fuelled in a fuelling shift.

The Jigsaw system has many export formats so that data can be passed to other systems, and specific exports for EP Morris etc.

Our Green Initiative ...

Jigsaw are committed to enabling the use of LNG, CNG and Bio Fuels and fully support a range of gas dispensers and have the necessary functionality to support both gas only and dual fuel vehicles without compromise.

REAL TIME FUEL MANAGEMENT OVERVIEW



1. Fuel Control Terminal is presented with or detects a vehicle ID tag (hand held or TeleTag)
2. The Terminal is connected to the Internet using the GSM Data Network
3. The Terminal contacts the web based Fuel Server to validate the tag
4. The Fuel Server sends back authorisation along with requests for more information and transaction limits (eg fuel types acceptable, max fuel quantity).
5. The fuelling starts and the fuel quantity is monitored.
6. At the end of the delivery, the fuelling details are stored locally and also forwarded to the Fuel Server in real time.
7. As the fuellings are received at the server, the transactions appear on the "Sites" screen and tank stocks are updated and also displayed so that the user has a real time view of all on site fuelling activity and stock levels.
8. If Required, E-Mails and Texts may be raised automatically to warn of low stocks, lost or stolen tag use, fuel theft etc.

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BUS AND COACH SOLUTION - COMPONENTS



There are two main types of fuelling employed; typically, coaches are refuelled by the driver and buses are refuelled by a fueller in a fuelling shift. Both types of operation are accommodated by the Jigsaw systems and can even co-exist with a fuelling shift for the majority and other fuellings on an ad-hoc basis.

For Driver refuelling operations a hand held tag is used to identify the vehicle with the mileage either typed in, or automatically gathered using the Jigsaw FuelGuard.

When Fuelling takes place on a continuous Fueller shift, speed is of the essence and Jigsaw have a range of systems which may be employed here. Originally, our EasyFuel Nozzle ID system was a favourite, but the use of non spill nozzles made it difficult to fit on many fleets, so the TeleTag system was developed.

All other ID systems are listed at the back of this brochure, but TeleTag will be featured as our ideal solution for fast and reliable fueller shift management.



For coaches, cars, vans and other vehicles where the driver is responsible for fuelling, a small, robust RFID tag is issued to the vehicle which is usually attached to the vehicles key ring. A second tag may be issued to the drivers so they may also be identified at the time of fuelling.



For fueller operations, a tag is fixed to the side of the vehicle which is read by the long range TeleTag reader as it pulls up to the pump. The fueller may also be issued with a tag so that fuelling will not commence until both a valid vehicle and fueller have been detected.

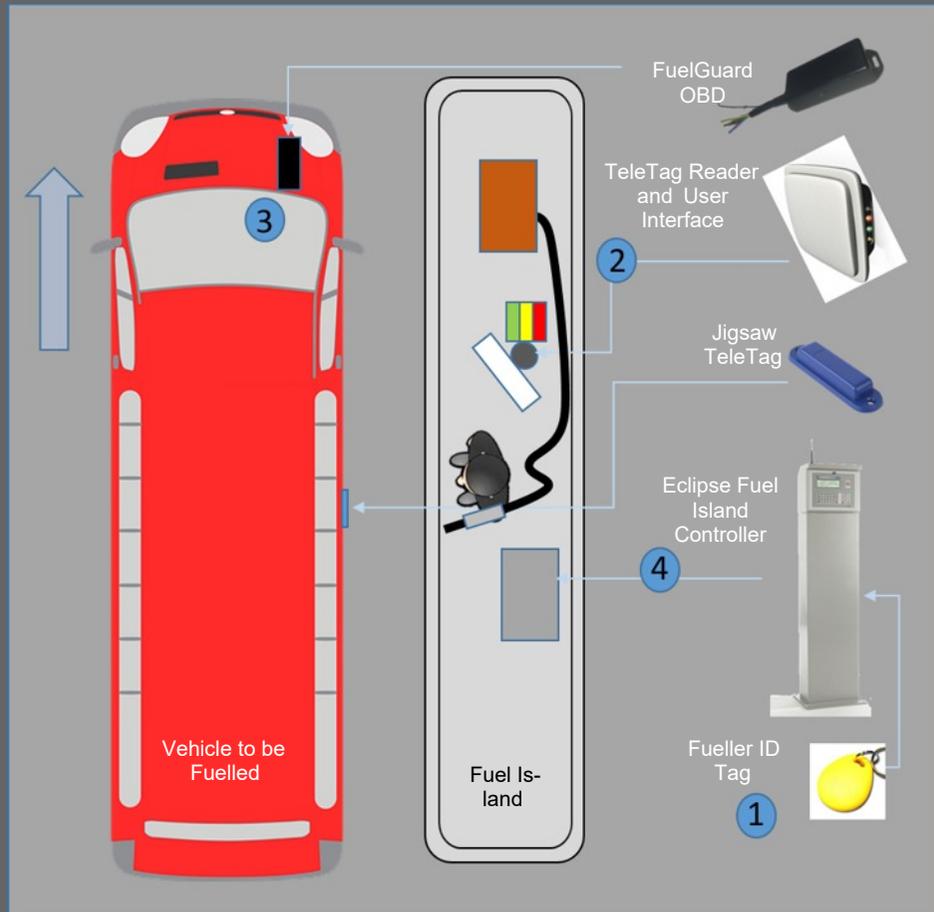


Optionally, for either system, a FuelGuard unit may be fitted to the vehicle so that the mileage is automatically captured at the time of fuelling. The FuelGuard also verifies the presence of the vehicle so that stolen tags cant be used without the vehicle being nearby.



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FUELLING SEQUENCE - FUELLER OPERATED



Fuelling Sequence :

1. The fueller presents their yellow RFID tag to the FMS (fuel management system) to log themselves on, indicated by a yellow light on the User Interface.
2. The Vehicle pulls into the fuelling lane and stops. The blue vehicle mounted tag is detected by the UHF tag reader which is indicated to the driver by a red light on the User Interface.
3. The vehicle ID number is passed to the Fuel Terminal, which then sends out a radio transmission to the OBD (OnBoard Device) which in turn confirms the presence of the vehicle by returning the current mileage.
4. The Fuel Terminal then validates the vehicle details checking fuel limits, product restriction etc. and authorises all required pumps. If all is OK, then the green light on the User Interface indicates that the pump is running and the vehicle is ready to fuel.
5. On completion the transaction data is sent to the web site and the system waits for the next vehicle to repeat the operation (2).
6. At the end of the shift the fueller presses the 'END' button on the Fuel Terminal to log off

Transaction Data Logged :

- Time and Date of Fuelling
- Vehicle being Fuelled
- Fueller ID (Optional)
- Pump ID, Product Type
- Fuel Lane and Site Name
- Fuel Quantity and Units
- Tank Gauge level (if fitted)

Benefits :

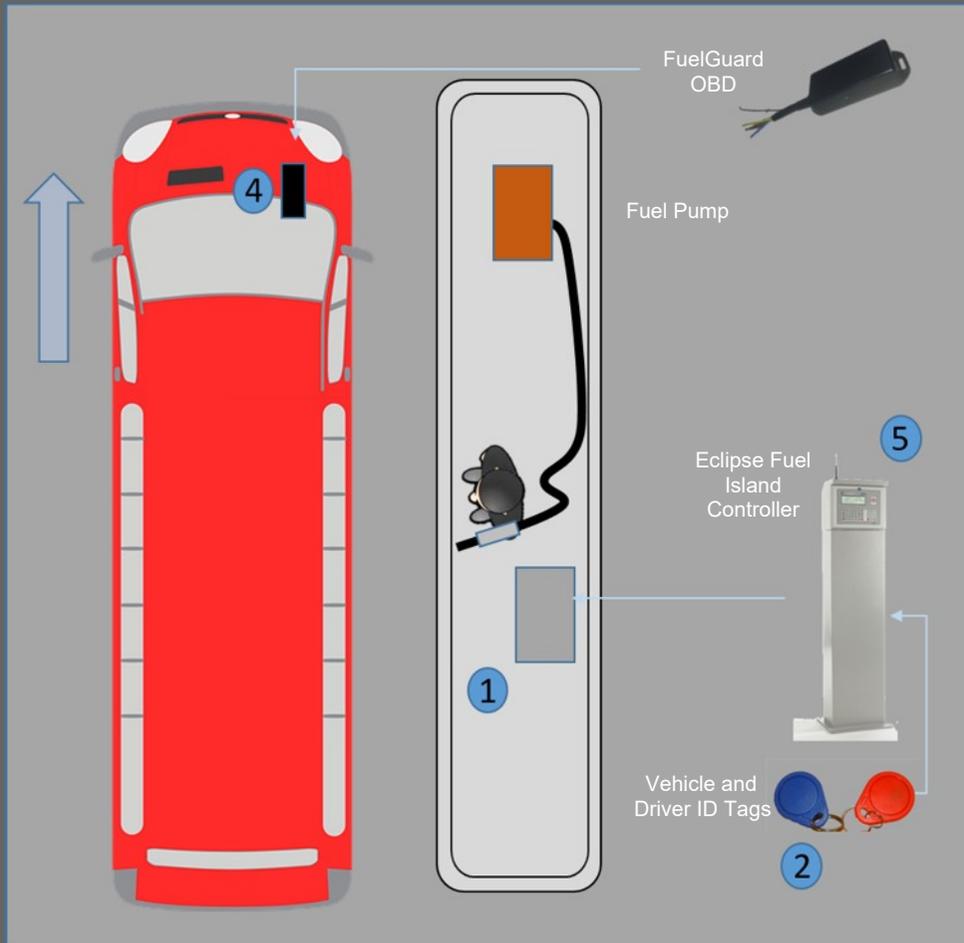
- Faster Fuelling
- Auto ID of Vehicle
- Auto ID of Fueller
- Vehicle Presence confirmation
- Automatic Mileage Capture
- Works with any Nozzle Type
- Works with Multiple Fuel Lanes

Before Any Fuelling :

1. Each Vehicle is fitted with a TeleTag adjacent to the filling point.
2. Optionally, each Fueller is given their own Fueller ID tag.
3. Optionally, each Vehicle is fitted with a Radio Linked FuelGuard Automatic Mileage Capture Unit.

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FUELLING SEQUENCE - DRIVER MANAGED



Fuelling Sequence :

1. The driver pulls up to the fuel island, leaves the vehicle and approaches the fuel management system (FMS).
2. The driver presents the blue RFID tag to the FMS which identifies the vehicle to be fuelled. If required, a second (red) tag may be issued to identify the driver as well.
3. If required, the driver will be prompted to enter the vehicles mileage before fuelling commences.
4. Alternatively, if a FuelGuard Unit is fitted, the FMS sends out a radio transmission to the OBD (OnBoard Device) which in turn confirms the presence of the vehicle by returning the current mileage.
5. The FMS then validates the vehicle details checking fuel limits, product restrictions etc. and authorises all required pumps.
6. On completion the transaction data is sent to the web site.

Transaction Data Logged :

- Time and Date of Fuelling
- Vehicle being Fuelled
- Driver ID (Optional)
- Pump ID, Product Type
- Fuel Lane and Site Name
- Fuel Quantity and Units
- Tank Gauge level (if fitted)

Benefits :

- Lowest per Vehicle ID Cost
- Driver ID Logged
- Automatic Mileage Capture Option
- Works with any Nozzle Type
- Works with Multiple Fuel Lanes

Before Any Fuelling :

1. Each Vehicle is issued with a RFID Fob Tag which is attached to the vehicles key ring.
2. Optionally, each driver is issued with a personal ID tag

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FUEL

Fuel Management Software

- Simple to Understand - Minimum Training
- True Real Time system - No polling required
- Unique Vision Tiles allow at-a-glance management
- Web Based (View Anywhere)
- Real Time View across all sites and assets
- No Dedicated On-Site Software
- Only a Browser is Required for access
- Desktop, Laptop, Tablet and Phone Sensitive site
- Real Time Stock Management
- E-Mail and Text Prompts
- Fully Automated Reports Generation



FUELLING YOUR FUTURE

JIGSAW FUEL

Fuel Management Software

Ground Breaking Software ...

The Jigsaw Fuel Software has been designed specifically to reflect the benefits of Real Time Fuel Management. The colour coded user interface highlights any issues as they occur, and allows the causes to be investigated easily. The unique user interface is very simple and intuitive to use requiring only minimal training and little in the way of IT experience.

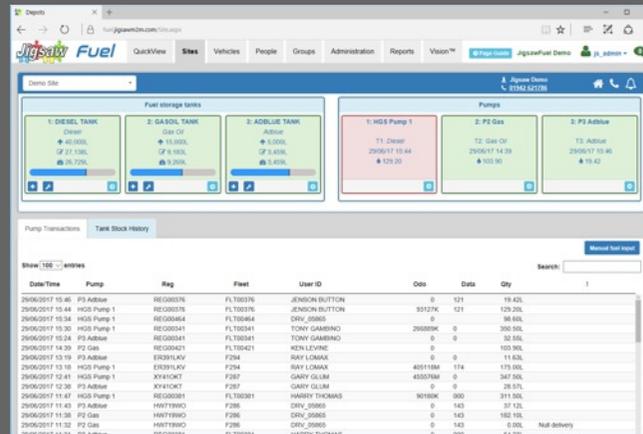
The software has been designed so that most functions can be accessed by no more than two mouse clicks.

Unique Features :

- Fully Centralised System - No on site server to manage.
- Software Updates Managed Centrally
- No Limit on Sites, Pumps, Tanks, Users or transactions - Large or small networks accommodated
- Configurable Report Templates that can be periodically auto e-mailed
- Graphical Gauge and Book Stock Comparison
- Unique Vision Tiles - Configure the site with information relevant to your business.
- Server to Sever Data Links - Where compatible, Auto Mileage Update from your vehicle tracking system.

Clear User Interface...

Above all other factors, Jigsaw have designed the user interface to be as clear and simple as possible. The site is consistent so that if you see something in red, you know there is an issue - click that warning and you see the details. The site screen is the heart of the user interface. This shows the status of all pumps and tanks on the site along with a list of all the latest fuelling events.



Whether you have one fuelling site or fifty, the data is shown in the same clear format. On larger networks, the QuickView page comes in to its own. This highlights any issues across an entire network of sites all on one page.

Real Time Stock Management :

As stock deliveries are entered, and transactions are received from your site, the fuel stock situation is updated on the web service. With a connected tank gauge, you get a real time comparison between book and gauge stock highlighting any issues in real time.

Jigsaw Vision™ Tiles :

The Jigsaw Fuel system has the Unique Vision Tiles which show real time information answering specific questions the user may pose about vehicles, people, fuel stocks, efficiency and even CO2 emissions.

Here are a few of an ever growing suite of jigsaw Tiles :

- Unfuelled Vehicle Tile - Updated every Minute - ideal for fuelling shift operations
- CO2 Emissions equivalence Tile
- Annual Fuel Usage Plot - 3 Year Overlay
- Unique Fleet "Swarm" Plot easily highlights mis-performing vehicles
- Fleet Highest Fuel Usage
- Fuel Price Plot - Direct Comparison of your purchase price to UK Average Price.



Average UK Fuel Stock Price



Fleet Efficiency "Swarm" Graph

Real Time Support :

As your Support Agent can view the same data as you, at the same time, any issues raised can usually be resolved during a telephone conversation so that support is fast and efficient.

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TANKGUARD

Fuel Stock Management

- Clear Web Site - Minimum Training
- True, Real Time system - No polling required
- Systems update on Significant Stock Change
- Web Based (View Anywhere)
- Real Time View across all sites
- Interfaces to most common gauge types
- Only a Browser Required for access
- Desktop, Laptop, Phone and Tablet Sensitive
- Optional E-Mail and Text Prompts

Remote Stock Management

Where Tank Stock Management only is required, the Jigsaw TankGuard adds a near real time interface to any compatible electronic tank gauge system. The system reads the gauge constantly and updates the web site periodically, or on any significant stock movement (up or down).

The system doesn't just cater for the high end tank gauges but can accommodate even the most modest. Also, gauging isn't just limited to fuel or fuel oils but can be used on just about any liquid or even bulk powder and pelleted products.



TankGuard Web Service

The Jigsaw TankGuard Web service logs the data from the on site tank guard units and presents it in a clear format, clearly showing low and critical stock levels, and graphing historic stock data. The system will also estimate the volume of deliveries in to the tanks, and predict when the tank will next need to be refilled.

The system can generate stock reports for any given date and time, and can even raise alarms if there is stock movements out of normal operating hours.

JIGSAW ID OPTIONS



RFID Tags

Most common form of ID, easily fitted to vehicles key ring, very robust.

- Simple to use
- Low Cost
- Use for Vehicle, Fueller or Driver ID
- Existing Third Party Tags may be used



Fuel Cards

Although not as reliable as RFID tags, if vehicle already issued with fuel card then may be used.

- No additional per vehicle cost
- All major card types accepted (mag only)



Dallas Keys

Used in several older systems, these may still be used when upgrading to Jigsaw.

- Robust Design
- Fit to vehicles key ring



Midas

Jigsaw Midas gives Auto Vehicle ID and Auto Mileage Capture just a touch of the Midas key.

- Miles or hours Run vehicle unit
- Fueller and Vehicle identified and mileage transferred



EasyFuel

Nozzle Based ID system - simply insert nozzle and fuel. ID Tag fitted to vehicles filler neck.

- No wires down fuel hose
- Optional OBD for auto mileage capture



FuelGuard

Fitted to vehicle and converts pulse train to mileage. Radio linked to Fuel Island Terminal.

- Auto Mileage or Hours Run capture
- Verifies vehicle present before fuelling.



Fuel Wand

Mainly used in mobile refuelling - tag fitted to vehicle/plant read by hand held FuelWand scanner.

- Ideal for Mobile refuelling Operations
- Simple to operate
- Identifies Fueller and vehicle.



Laser Plate

Radio Linked rechargeable bar code scanner reads ID and data bar codes

- Bar code can be used to limit fuelling quantity
- Low cost ID



TeleTag

Originally developed to optimise Bus Refuelling operations. Auto ID's fueller and vehicle.

- Speeds up refuelling operations
- Use with FuelGuard for a complete Auto ID/Auto Miles capture system.

JIGSAW SYSTEM OPTIONS

Data Import

If you use Fuel Cards offsite, then the Jigsaw Web Service can read a file from your card provider so that these are listed along with your on site fuellings. A full picture of all vehicle fuellings is essential in order to calculate MPG figures, and to spot poor vehicle performance or fuel theft.

Data Export

It is sometimes necessary for fuelling data to be exported to other software systems such as fleet management packages, SAP, accounting packages and the like. The Jigsaw system can export data in many formats from simple text files such as CSV through Scheduled FTP transfer to Direct, real time Web Service data transfers.

Telematics Interfaces

The Jigsaw system has been linked, server to server with several telematics (Vehicle Tracking) servers. When a fuelling transaction is received on the Jigsaw server, it connects to the telematics server to recover the mileage at the time of fuelling.

Automatic Reports

Jigsaw provide a range of basic report styles which can be configured to each users requirements. The resulting template may then be saved and scheduled to automatically run periodically and be e-mailed to the relevant user.

Automatic Low Stock Warnings

The jigsaw system may be configured to automatically send e-mails to the relevant users when fuel stocks fall below the tank reorder value.

Pump Types

Normal - Pump started by authorisation, fuel drawn decrements from associated tank.

Debowser - Pump started by Auth, but fuel drawn adds to tank stock.

Integrated - FM Display switches to Large Character Fuel delivery Display during transaction.

Delivery - Forms stock delivery transaction - used to automatically monitor tank inlet.

ID Options :

- RFID Tags - Including non-Jigsaw Tags
- Magnetic Cards (eg Fuel Cards)
- Jigsaw EasyFuel - Nozzle based ID System
- Jigsaw Midas - Auto Mileage Capture
- Jigsaw FuelGuard - Auto ID/ Auto Mileage
- Jigsaw LaserPlate - Bar Code Reader
- Jigsaw Fuel Wand - Remote Tag Reader
- Jigsaw TeleTag - Auto ID/Mileage Capture

Access Options :

- Logged Fueller Mode - Fueller logs on once at start of fuelling shift - types in vehicle ID before each fuelling
- UnLogged Fueller Mode - As Logged fueller, but Fueller ID presented at each fuelling.
- Data Entry - Two unchecked data prompts - eg "Enter Fleet", "Enter Collar Number", "Enter Job Number" etc.
- Odometer entry - Miles, Km or Hours - No check, Under Check or Range Checking (Mileage must be larger than last but not too large)
- Fuel Limits - By Transaction, by Day, by Week or by Month.
- Driver ID using second tag or typed ID entry.

JIGSAW - FUELLING YOUR FUTURE



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