

2.4GHz Active RFID Solution for an Oil Company

Case Study

Electronic Fuel Delivery System

(powered by Empress™ 2.4 GHz Active RFID)

Meeting the rising energy demand and overcoming its pollution problems have become emergent issues in recent years. Sustainable new energy source is being developed to ease the problem. Yet, it is never an easy task, which may take decades to complete and involve enormous costs. Using energy wisely and efficiently is another critical way to solve the issue. An Electronic Fuel Delivery System (EFDS) was developed to help oil companies enhance energy consumption efficiency.



Existing challenges when refuelling vehicles & machines on construction sites

- *How to speed up the entire fuel injection process without human mistakes?*
- *How to obtain accurate and reliable fuel consumption & vehicle performance data for analysis?*
- *How to reduce unnecessary fuel wastage to reduce costs?*

Unique Features and Benefits of EFDS

- ✓ **2.4 GHz Active RFID Tag**
High Durability
High Sensitivity
High Readability



- ✓ **LED Light on ID Tag**
Easy Identification of vehicles

- ✓ **Mobile Handheld Reader**
Handy & User-friendly
Automate & allow control of the whole process



- ✓ **Communicated with Computerized system**
All data collected is stored & send to office
Generate analysis reports in real time for monitoring

EFDS Components

Flow Meter



»»» get fuel volume »»»



The ES-Box works well with any Electronic Meter Register (EMR) System or flow meter that communicates in R232/RS485 or TCP/IP to get fuel volume data.



Oil Tanker Truck

Within the oil Tanker Truck, an ES-box is installed and connected to flow meter.

data transfer



2.4 GHz Active RFID Handheld Reader
HKRAR-5080EM

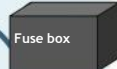
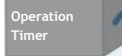
The Mobile Handheld Reader consolidates the fuel data from ES-Box and operation time from Operation Timer with vehicle ID, to generate fuel-efficiency report. It can also be used to identify the right target construction vehicle for fuel injection.

Operation Timer is connected with the fuse box of construction vehicles by direct wiring. Operation time data of the vehicle will be recorded automatically.

Construction Vehicle



««« data recording «««



LED light on the ID Tag will turn on when the Mobile Handheld Reader sends RF signal to it. It helps to confirm which vehicle is refueling using short range RF.

Operation Flow of EFDS



Simple 4 steps in Vehicle Tracking

Step 1:

When the operator chooses the ID of a specific vehicle using the **Mobile Handheld Reader**, the LED on the **ID Tag** lights up for identification.

The operator then presses "START" button on the **Mobile Handheld Reader** for oil injection.

Step 2:

The **ES-Box** in the oil truck automatically records the starting and stopping time and injection amount of oil injection.

Operation Timer connected to the **fuse box** of each vehicle automatically gathers operation time data by capturing the current that passes through the fuse box during operation.

Step 3:

The **Mobile Handheld Reader** will download data from the **Operation Timer and ES-Box** automatically for efficiency analysis.

The **Mobile Handheld Reader** can synchronize data with the **ES-Box** to make sure reading of the right machine with accurate data.

Step 4

The **Mobile Handheld Reader** communicates with **Bluetooth Printer**. Receipts can be printed for validation on the site.

The **Mobile Handheld Reader** also downloads its data to a PC to generate reports for further analysis.

Existing Problems		Our Active RFID solution
<p>Durability & Efficiency</p> <ul style="list-style-type: none"> • Barcodes are easily damaged • Misreading and inaccuracy • Need to search for the barcode, time consuming 		<ul style="list-style-type: none"> • Durable <i>ID tag</i> • Free from dirt / oil / grease / paint • Shock-proof, waterproof • No need to search for the tag • Long reading range 
<p>Data accuracy</p> <ul style="list-style-type: none"> • Manually takes record from flow meter, mistakes and errors might occur • "5-second" rule: <ul style="list-style-type: none"> • Cut off time and data is not accurate • Errors in consolidating or 'over-splitting' 		<ul style="list-style-type: none"> • Start and finish time is accurately recorded • No constraints by 5-Second rule • Can choose specific vehicle to inject oil by <i>Mobile Handheld Reader</i>
<p>Wrong mapping</p> <ul style="list-style-type: none"> • Record data from the wrong vehicle • Mistakes made by "5-second" rule 		<ul style="list-style-type: none"> • Clock system • Synchronize <i>Mobile Handheld Reader</i> & <i>ES Box</i> automatically • Make sure reading the right machine with accurate data • <i>Mobile Handheld Reader</i> can communicate with <i>Bluetooth Printer</i> and generate a receipt on the site
<p>Analytical Ability</p> <ul style="list-style-type: none"> • Paper-base system of raw data only • No cross referencing of data for drawing meaningful reports 		<ul style="list-style-type: none"> • Electronic database of raw data • Tables and reports in Excel format • Efficiency reports

Business Benefits

- **By analyzing fuel efficiency data, vehicle health can be also determined e.g. vehicle or machine needs refilling of motor oil or lubricant as efficiency is low**
- **Accurate fuel consumption data to prevent human errors or intentional stealing**
- **Prevents abuse of vehicles and machines**

Company Awards:

