On-site RFID rental unit delivers time, money and labor savings

❙ RFID makes self-service equipment rental practical for Speedy Services

Omni-ID
Intelligent Tracking & Monitoring Devices

In partnership with

MOTOROLA

omni-id.com

Speedy Services is the UK's leading provider of equipment, rental and support services to a wide range of clients across the construction, infrastructure, industrial, rail, manufacturing and facilities management sectors – as well as to local trades and industry.

Results

Address
Speedy Services
Chase House
16 The Parks
Newton-le-Willows
Cheshire. WA12 0JQ
United Kingdom

Industry
Equipment Rental

Key Benefits
• Better equipment utilization
• Better asset management
• Reduced transport costs
• Lower staffing costs
• Reduced CO_2 emissions
• Instant geographical coverage
• Just-in-time equipment servicing
• Reduced paperwork
• Reduced phone calls for
  customer service and
  delivery requests

Speedy has a network of over 320 depots across the country, from which equipment can be dispatched to by one of 1,200 delivery vehicles or directly collected by the customer.

However, some of Speedy's customers require a more specialized service – an 'onsite' depot with flexible hours to accommodate the schedules of their various crews. Providing this service requires a delivery van with a stock of tools and equipment, as well as a Speedy employee to remain at a single site to conduct transactions. While it's essential for Speedy to meet the needs of these customers, dedicating a vehicle and staff member that might otherwise be serving multiple sites made the service costly to deliver.

So Speedy began to look for a better way.

The Challenge:
Expand Services; Expand Market

Speedy Services rents tools and equipment to the construction and industrial markets. The logistics of providing such equipment have always involved meeting the customer wherever the job is. Speedy owes its success to its development of a network of depots across the UK, from which customers can either collect equipment directly or have it dispatched to the job site by Speedy's fleet of delivery vehicles.

However, increasingly Speedy's customers were asking for an even more specialized service. Daily scheduled equipment deliveries weren't sufficient to meet their needs; they wanted the greater flexibility of an 'on-site' depot that could rent tools on a pay as you go basisby the hour to accommodate the schedules of their various crews. Speedy managed such customers by assigning an employee, and a stocked storage container and a delivery van to remain at the customer's job site. Needless to say, dedicating a vehicle and staff member that might otherwise be serving multiple sites made the service costly for both Speedy and its customers.

Seeking a more efficient way to serve such on-site customers, Speedy proposed to create a self-service equipment storage and rental system. They envisioned an RFID-equipped mobile equipment 'pod' that could be transported on the back of a small delivery vehicle and maneuvered by fork-lift. The pod would be stocked with the specific tools and equipment required by that customer. Tools leaving or returning to the pod would be automatically tracked and rental fees assessed by means of embedded RFID tags and a UHF RFID fixed reader integrated in the pod.

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Key System Components

RFID Hardware
- Motorola FX9500 8-Port Industrial Fixed Reader
- Motorola AN400 High-Performance Area Antenna
- Motorola AN480 Single Port Antenna

Omni-ID RFID Tags
- For small portable electric and pneumatic hand tools: Omni-ID developed the Prox Fi tag specifically for Speedy e-Pod.
- For larger electrical items and transformers with a plastic housing: Max SQ tags.
- For larger assets with a metal housing: Max SQ tags , fixed by means of tamper-proof selftapping bolts.
- For cables and scaffolding sections: Omni-ID developed the Grip tag, which is fitted by means of zip-ties.
- For larger assets: the Omni-ID Max HD tag gives a longer consistent read range for ease of readability.

Codegate Custom Software
- Codegate developed custom software that talks the user through the process, using voice prompts to make the entire experience simple to follow.

Codegate Electronics
- A custom control module was designed and built by Codegate. Essentially the brain of the system it integrates all the key electronics components including reader, GPRS router, computer and digital I/O board.

Initially Speedy involved a highly recommended consultant from mainland Europe who worked with an equally recommended integrator. Unfortunately, neither was able to demonstrate UHF tags that were readable in construction environments. Three months of work with another highly recommended RFID integrator, unfortunately, yielded the same disappointing result.

Following these two failures, Speedy executives attended the RFID Journal Live event in Darmstadt, Germany. After speaking to many other RFID experts, they were convinced that the technology could work as they envisioned. Speedy set out again to find the right people who could help.

The Solution:
The Right Experts, The Right Products

Speedy contacted numerous tag manufacturers from around the world to request sample tags. Then, working with Codegate, an integrator who had previously helped with successful mobile IT projects, Speedy began testing to find a combination of tags and readers that could function reliably in the dust and dirt of a construction site, where metal surfaces, liquids, radio-based communications, unshielded generators and other RF interference sources are the rule rather than the exception.

"The final system design exceeded the dynamic and static load tests."

A variety of UHF RFID tags were fitted on or inside Speedy equipment. Mounting UHF RFID tags inside power tools and onto metal surfaces required optimal positioning to ensure that tags would be out of the way of the equipment user, protected against removal and yet remain readable by the portal. To properly tag some equipment, tag manufacturer Omni-ID developed new fixing techniques, including a zip-tie system to keep tags from moving or slipping in use or storage. The tag development process incorporated ATEX certification and HALT testing to ensure tags would meet or exceed shock and vibration standards for use in military or hazardous environments.

RFID read performance was then tested in an anechoic chamber at Omni-ID's UK base. After less than ideal results with other readers, the introduction of the Motorola FX9500 into the design increased read rates by ten times or more, ensuring reliable reads for every scan. The FX9500 features an IP53 ingress protection rating and an extremely rugged design, built to perform in extreme temperatures and dusty environments. The iterative design process and customer input ensured that the final system design exceeded the dynamic and static load tests needed for Speedy's customer environment.

Proof of Concept

Once initial tests had demonstrated that RFID could provide reliable and accurate data capture even in a challenging environment, a pod unit was constructed by Codegate to demonstrate a proof of concept for the self-service system. Speedy spent several months testing the concept unit. Internally, many modifications were made throughout the trial including several versions of the software, reader and antenna placement, and reviewing different ancillary equipment used in the system. Once the technology was refined, attention turned to making the unit self-contained in a 'pod' style, designing and building the prototype unit. The prototype was then also tested and amended before being shown to some of the largest construction companies in the UK for their buy-in. Production was approved and deployment of the first units was scheduled.

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Key benefits for Speedy's customers

- 24/7 equipment availability
- Better equipment utilization
- Improved live asset movement visibility and utilization
- Reduced transport costs
- Reduced rental costs with "pay as you go" rental
- Reduced CO_2 emissions
- Instant reporting
- Reduced paperwork
- Reduced phone calls

The Speedy ePOD™

The ePod™ is an unmanned, self-contained, self-service rental/hire portal that can be inserted inside a warehouse shop or standard shipping container. The ePod™ can be transported quickly and easily using a truck and a forklift. Lighting is connected and operated by the ePod™'s built-in Passive Infra-Red (PIR) sensors. No other electrical service is required.
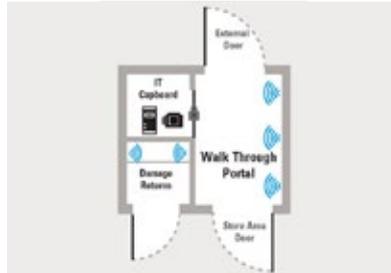
Operation

The customer is issued a unique LF RFID entry tag for each authorized ePod™ user. As a user approaches the ePod™, a simple "traffic light" system reports the unit's status: red means out of service, amber means currently in use, and green means ready and available. When the unit is available, the user simply swipes the entry tag to unlock the external door and enter the ePod™

Inside, the ePod™ is divided into three chambers:

- The walk through portal, equipped with RFID antennas
- The damage store area, also equipped with RFID antennas
- The IT cupboard containing the control module incorporating digital I/O board, fixed RFID reader, GPRS router, PC and UPS power supply. This area is locked to users.

On entering, the user is greeted by an audible welcome message and talked through how to use the unit. (Entry tags can be programmed to use a specified language file for each user.) As the user stands in the walk-through portal area, an automatic scan determines whether any tools are being returned into stock.

When the scan is complete, another set of traffic lights indicates when the user can enter the storage area. Returned items are placed back on the racking inside the storage area unless they are damaged. Those are returned into the damage store; the system automatically alerts Speedy that the equipment is to be replaced.

After returning and selecting equipment, the user presses the door release button on the ePod™ and re-enters the walkthrough portal. Again, the user is scanned for assets that they are taking out. When the scan has completed, another green light lets the user know they can now leave the ePod™.

All asset movements and ePod™ status reports are sent back to Speedy over the mobile phone network via a GPRS transmitter. Every movement is accompanied by a photograph of the user taken by a built-in webcam.

Equipment movement data and asset status from the ePod™ are available to the customer via Speedy's extranet web portal, including reports of all items in the damage store. The same information is sent to Speedy by way of an internal web portal. Alerts and warnings from the ePod™ generate an e-mail and/or SMS text message both to the customer and to Speedy. Asset movements are passed back into Speedy's Enterprise Solution which is delivered using Microsoft Dynamics AX. This system automatically generates all invoices.

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The Results
Eager Early Adopters

The project is currently in the production phase. Five ePod™ units will be deployed initially, with a further 30 estimated to be completed by year end. A number of leading contractors are already lined up to use the first units for major construction and infrastructure projects in the UK.

Speedy ePod™ units will be supported from Speedy's central workshops, which will take responsibility for looking after ePod™ installation and maintenance, ensuring no impact on the traditional depot network. New-user tag setup and enquiries will be managed by the central customer services team. Speedy expects to tap an entirely new revenue stream with very little additional resource requirement.

Anticipated Rewards

The ePod™ solution will enable Speedy to offer improved and more cost-effective service to on-site customers, as well as to customers in geographical areas not currently served by Speedy depots. Customers will have 24/7 access to the equipment they use, providing complete flexibility to meet variable work crew needs. Customers will also benefit by paying rental fees only when the equipment is actually in use, reducing their total operating costs. In addition, automatic updates of each customer's "My Speedy" extranet account will provide greater visibility to current usage patterns and associated charges, enabling customers to plan and budget more effectively. is too (scanning is up by nearly 40%).

Overall the robustness, performance, ease-of-use and lack of unauthorized replication of these tags has delighted the project owners at Container Centralen.

For Speedy, self-monitoring ePods™ will significantly reduce equipment drops to each site, not only cutting delivery fleet mileage and maintenance, but also helping to keep CO_2 emissions in line with Speedy's Ato improve asset tracking, One Plan initiative and ongoing commitment to improving the environment. With all transactions instantly visible to customers, Speedy anticipates a marked reduction in paperwork and customer service calls related to delivery and charges. The unmanned units will also save staffing costs, while a real-time, fully visible and reliably accurate inventory accounting will help ensure better utilization of their equipment inventory. Improved inventory deployment and better visibility of current use patterns is expected to expand Speedy's sales opportunities with both new and existing customers.

The Speedy ePod™ is an innovative, customer-driven solution that takes maximum advantage of the automation capability of RFID. On site, the ePod™ will deliver greater convenience, easy access and costeffective service, all while giving both customers and Speedy Services full, real-time visibility of inventory use and need patterns.

Speedy's Senior Project Manager, Glyn Matthews, says, "The ePod™ is the solution our customers have been waiting for. As a company who is driven by ensuring our customers are at the heart of everything we do, we're proud to have such great partners who helped us achieve this goal. A lot of thought and innovation have gone into the design and build of this product to make self-service tool rental a simple operation. We believe that it offers a truly unique and versatile addition to the UK rental market, whilst also upholding our commitment to sustainability and developing products that reduce our carbon footprint. The ePod™ has many possibilities around the world to help with our global expansion, and we look forward developing it further."

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>
> **Glyn Matthews,**
> **Senior Project Manage, Speedy Services**

Designed

- High UV tolerance
- Label should adopt as little dirt as possible (slippery/low moisture absorption)
- Weight below 23 grams
- Label pull strength above 15kg
- If the label is removed, it should be visibly damaged and not be reusable
- RFID performance should be the same or better as with the red tag

Tested

- Water resistance (non emersion: exposure to rain and watering of plants)
- Resistant to solvent and chemicals used in agriculture grower and retail operation (like chloring solutions)
- Storing temperatures from -30 to +70, operating temperatures from - 10 to +60
- Material tested for the automotive industry

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Visit www.omni-id.com to learn more or email sales@omni-id.com for all product or technology inquiries and we will be pleased to get in touch.

Omni-ID is the leading supplier of passive, low-profile UHF RFID solutions. Through our patented technology, Omni-ID "cracked the code" to overcome the problems traditionally associated with RFID, enabling a broad range of new applications that improve accuracy and efficiency in asset tracking, supply chain management and work-in-process. Our family of versatile RFID tags works reliably in the harshest environments, including on, off, and near metal and liquids and excels in solving tracking and identification challenges with unprecedented accuracy. With offices in the USA, UK, Asia and India backed up by a purpose-built manufacturing facility in China, our mission is to drive the widespread adoption of RFID and wider IoT technologies as the optimal tracking and identification devices.