

Low-voltage motorised rollers ensure energy efficiency in Royal Mail new distribution center



With a view to optimizing the delivery times of mail items (letters and parcels), Royal Mail has launched an extensive investment program. The focus of the project was to combine several distribution centers in one location. The result is a distribution center featuring a material flow technology which stands out, among other things, for extremely high energy efficiency

The Royal Mail international distribution center near Heathrow, London, is among the most technologically advanced mail sorting centers in the world. The company has invested 436 million euros in this distribution center covering an area as big as six football pitches. All mail items (letters and parcels) that are sent to and from the UK will now pass through the site which replaces eight old mail distribution centers in the UK. The new facility has been designed to ensure a handling capacity of up to ten million mail items per day, for

24-hour operation. Core of the distribution center is a 12-km long conveyor system, operated by energy-efficient Power Moller type drum motors by the Japanese company Itoh Denki.

No energy consumption in stand-by mode

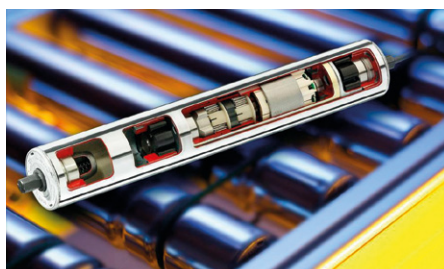
The large daily volume of mail items can only be mastered with a high degree of automation and integrated control technology. For this purpose, incoming mail

Project overview	
Tasks	<ul style="list-style-type: none"> ■ Control of up to ten million mail items (letters and parcels) per day ■ 24-hour operation ■ Low energy consumption ■ High degree of automation and integrated control
Details of the system solution	<ul style="list-style-type: none"> ■ In terms of conveying technology, 10,000 24-V DC Power Moller type brushless rollers are used ■ Adjustable conveyor speeds and transport configuration ■ Smooth and quiet operation of charge carriers on ball-bearing rollers ■ Energy-efficient low-voltage motor rollers, no power consumption when in standby mode ■ Easy integration into PLC ■ A CB016 control board provides for individually adjustable, soft start and stop as well as dynamically adjustable speed control; it features an integrated dynamic brake and provides error analysis.

Source: Itoh Denki

items are first scanned and, after determining their dimensions, made unambiguously identifiable through coding, for any further processes in the distribution center. Subsequently, letters and parcels arrive in the appropriate sorting area where automatic address detection takes place via a scanner.

Then, letters and flat items are automatically placed in trays, after being sorted according to their delivery addresses. An approximately 4-km long roller track, integrating the energy-saving drum



01 The 50-mm diameter drum motor housing the drive technology



02 The control board allows for the individual configuration of the drive rollers, e.g. in terms of conveying speeds

Photos: Itoh Denki/Fotolia

About Itoh Denki

Founded in Japan in 1946, Itoh Denki placed the 24-V DC motor roller on the market in 1989. The consequent further development and improvement of this technology eventually led to the Power Moller drum motor series.

From the Japanese parent company, namely the ISO 9001-certified factory in Kasai, the company supplies subsidiaries in America, Asia and Europe in addition to its home market. Research and development as well as manufacturing technology for the production of drum motors and their controllers are solely carried out in-house.

motors by Itoh Denki, acts as a connecting element between the single target stations.

The 24-V DC Power Moller type rollers are brushless (**Image 01**). With a 50 mm pipe diameter, high torques are possible using this technology. Each drive roller is operated by an easy-to-use CB016 board (**Image 02**), whose commutation voltage can control both the roller operation and various other steering options through an external PLC. Another feature of this modular, compact solution, when compared to external drives, is its low noise level. The belt conveyor integrated in the material flow layout consists of a variety of zones. Each of these zones is driven by a single drum motor. Each roller can be individually controlled for each zone and is enabled only when needed. Compared to a drive system running with a geared motor in continuous operation, drive belts and pneumatics

systems or couplings, these features create the pre-requisites for high energy savings. Calculations have demonstrated that the use of Power Moller rollers allows reducing the required energy by up to 60% comparable conveyor section as against a pneumatic gear drive solution. In addition to energy expenses, maintenance and repair charges are included in the list of the total operating costs of a plant. Also in relation to these items, Itoh Denki drum motors can help users to improve their cost balances. For drive solutions with belts and couplings, in many cases these components require replacement after only two years since commissioning, whereas the manufacturer's drum motors have a product service life of approximately 20,000 operating hours.

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