



LEONARDO AUTOMATION

MBHS®

CROSS-BELT SORTER



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The Multisorting Baggage Handling System (MBHS®) is Leonardo's cross-belt suite of sorter for baggage handling.

Always looking for the latest, most suitable and efficient solution to satisfy customer needs and requirements, Leonardo includes in its portfolio the MBHS®-HD Heavy Duty (HD). This version provides a series of technical functionalities in order to improve the ability to fit into multilevel buildings.

The sorter is the core of modern Baggage Handling Systems. The cross-belt is now the preferred technology for baggage processing as it ensures optimum handling for all items, including the bags with high friction surface (e.g. wrapped in the protective plastic film or with rubber parts), with irregular shape, protruding wheels, laces and non-conventional bags.

Advanced technologies, such as linear motors, inductive power distribution and Wi-Fi data transmission, give this product an extremely high reliability, a sorting capacity up to 6,600 bags per hour for MBHS®, 7,212 bags per hour for MBHS®-HD and a high operational flexibility.

The intrinsic redundancy and lower footprint of the MBHS® ultimately results in highly efficient BHS systems. Reliability, security and low O&M costs are the key factors of the success of the Leonardo's MBHS®. The possibility of reducing the speed of the sorter according to the required throughput and the minimal points of friction in all the components allow significant O&M cost savings.

MBHS® assures the total control over the loading and unloading motions of the baggage, eliminating the dependency on 'natural forces' (gravity and friction) within the system. This guarantees the maximum reliability and resilience in tracking and almost removes all risks of bag jams and mis-sorting.

The MBHS® cross-belt technology guarantees precision and smoothness of the baggage handling process: no bags can get stuck due to hanging of straps or to high adherences of the surfaces.

The technologies and the technical architecture implemented in the MBHS® give an intrinsic redundancy to the entire sorting system. The control system modulates the speed of the sorters according to the required throughput, reducing the total length travelled by the sorter, prolonging its life.

The reduction of the maintenance effort, the absence of extra costs due to possible damages or mishandling of bags and the possibility to reduce the speed of the sorters in periods of low throughput demands, result in considerable savings in the operational and maintenance costs. Independent studies quantify savings of about 20%.

The precision of the unloading process of bags and the possibility to install chutes on curves allow the design of smaller footprint sorting systems. Some kinds of out-of-gauge baggage can be loaded onto two cells and unloaded into standard chutes.

With this highly resilient design, airports can depend on MBHS® to maintain continuous baggage flow, minimal downtime, and peak efficiency—even under demanding conditions.



MBHS® is intrinsically redundant

The MBHS® cross-belt sorter is engineered for maximum uptime, ensuring seamless baggage handling even in the face of component failures. Its intrinsic redundancy minimises operational risks by dividing the system into independent trains, each with its own communication and control system. This means that if a component fails, the rest of the sorter remains fully functional.

MBHS® is a “small” sorter

The full control of the motion and the trajectories of bags when unloading allows the use of smaller chutes. Moreover, it is possible to target the unloading of individual bags in a specific section of the chutes, avoiding the creation of “piles” of bags.

The MBHS® has been designed to have the smallest possible vertical profile, in order to be installed in existing buildings where the limited height of the ceiling could not allow the installation of other technologies. Moreover, two sorters can be installed on top of each other in a limited vertical space

MBHS® is a friction free mechanism

Linear motors are used for the traction of the sorter loop; inductive power distribution and Wi-Fi data transmission eliminate any contact between the moving and the fixed part of the machine, except with the rolling wheels.

MBHS® is a reliable sorter

The absence of moving parts in the main traction system, using synchronous linear motors, guarantees a reliability level much higher than conventional friction drive mechanisms.

The absence of any contact part for the transmission of the power and the data to the sorter's cells guarantees the higher possible reliability of these mechanisms

THE MBHS®-HD SORTER

Leveraging the experience in cross-belt based BHS in several airports in Europe and the rest of the world, Leonardo developed a version of the sorter that extends the already top-level characteristics of MBHS® with some new features:

- Increased slope: 15° - this allows a further footprint reduction of about 20% in the change of level
- Difference in height in excess of 8 meters – allows the connection of different levels of airport facilities (i.e. one single sorter can be used to move baggage among the floors of the building, without the need to use elevators)
- Curves with radius (2,8m) reduced, compared to the standard model (3,5m)



KEY FEATURES

WELCOME TO THE FUTURE OF BAGGAGE

ENCODERS

Continuous operation without loss of performance is ensured for critical components, like encoders through a hot backup configuration.

ADVANCED WI-FI COMMUNICATION

Encrypted and contactless data transmission is provided between the Sorter Control System and cells.

FLAPS

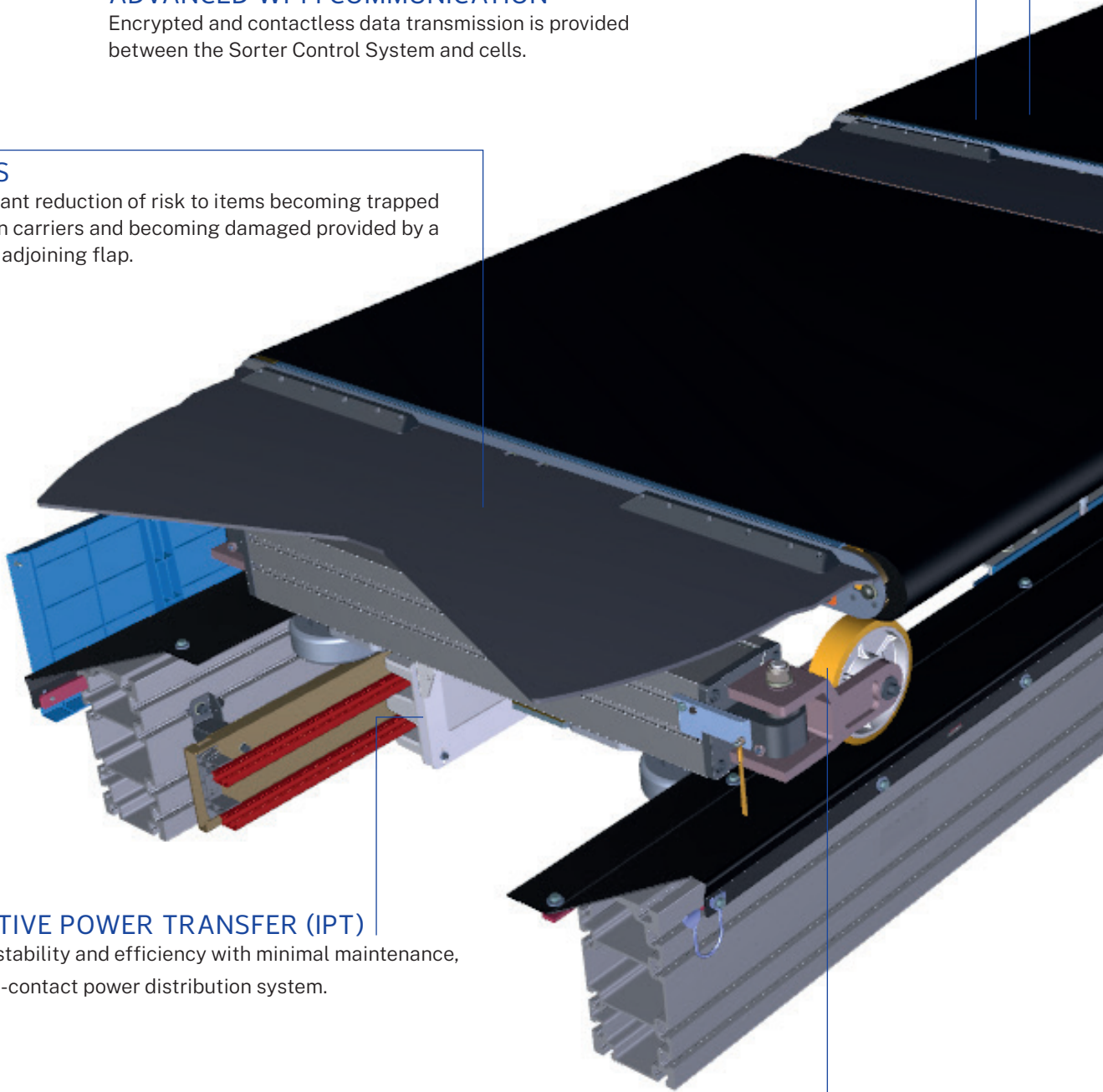
Significant reduction of risk to items becoming trapped between carriers and becoming damaged provided by a smooth adjoining flap.

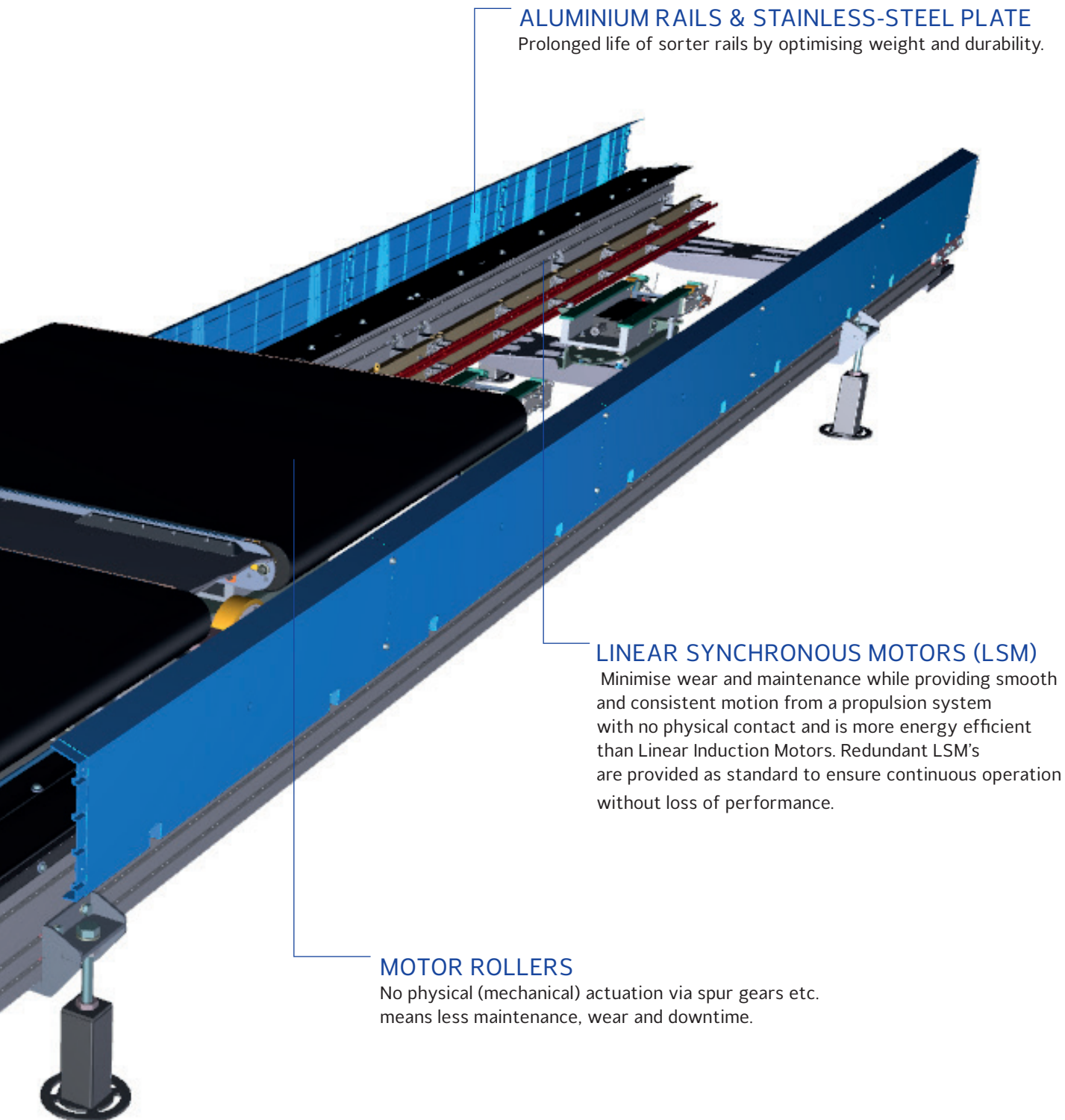
INDUCTIVE POWER TRANSFER (IPT)

Achieve stability and efficiency with minimal maintenance, with, non-contact power distribution system.

WHEELS

Wear resistant Neoprene wheels are the only contact point between carrier train and rails, further reducing maintenance needs.



**ALUMINIUM RAILS & STAINLESS-STEEL PLATE**

Prolonged life of sorter rails by optimising weight and durability.

LINEAR SYNCHRONOUS MOTORS (LSM)

Minimise wear and maintenance while providing smooth and consistent motion from a propulsion system with no physical contact and is more energy efficient than Linear Induction Motors. Redundant LSM's are provided as standard to ensure continuous operation without loss of performance.

MOTOR ROLLERS

No physical (mechanical) actuation via spur gears etc. means less maintenance, wear and downtime.

SORTER FEATURES

RECENTERING FUNCTION

The sorter is equipped with a bag recentring function to align each bag with the centre of the carrier. This improves ejection of bags.

BAGGAGE DETECTION CHECK

The system prevents loading errors by utilising photocells to verify that a carrier has successfully ejected its previously loaded bag and ensuring it is empty and ready for the next induction.

EASY SPEED REGULATION

The sorter speed is easily adjustable by SCADA, so when there is less demand, the sorter can run at a lower speed, saving energy and reducing wear.

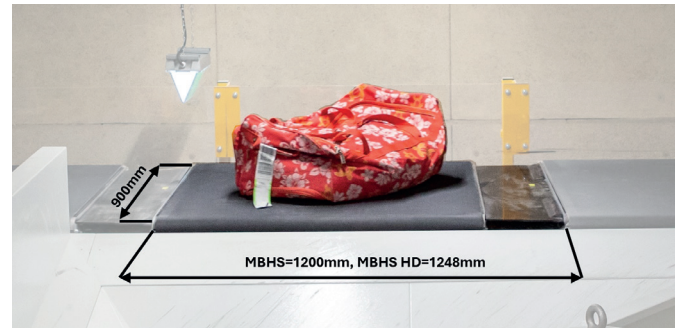
MONITORING AND CONTROL

Advanced monitoring and control systems enhance the Leonardo sorter's efficiency by providing real-time diagnostics, performance tracking, and automated adjustments. This reduces downtime and optimises overall throughput.

ADVANCED DIAGNOSTICS

Leonardo has introduced advanced diagnostic tools, enabling continuous, real-time monitoring and diagnostics during system operation (at operational speed) – not just during maintenance windows. This shifts maintenance to a fully proactive approach, fostering predictive analytics and continuous learning from archived historical data.

- Sort Guard-F: a fixed monitoring station that tracks carrier height, pitch consistency, wheels profile, geometric alignment, ensuring stability and precision
- Sort Guard-M: a mobile unit mounted on a carrier, continuously analysing IPT cable positioning and FOD along the entire sorter path



Both tools form the foundation of Leonardo's predictive maintenance strategy, where real-time data processing and machine learning optimise intervention timing, minimising unplanned downtime and ensuring peak system performance.

THE MBHS® MAIN BENEFITS

- **High Reliability:** The system is designed to be intrinsically redundant
- **High Capacity:** Maximise throughput with a high density of cells per minute
- **Wide Range of Loadable Items:** Sort parcels of any shape and size with ease
- **Gentle and precise Loading and Unloading:** Ensure items are handled with care for better quality assurance and chute fill optimisation upon exit from sorter
- **Low Noise:** Enjoy smooth operations with minimal noise and disturbance
- **Optimised power consumption:** Adjust speed of the system to meet varying demands effortlessly and reduce energy consumption when not needed

TECHNICAL DATA

Specification	MBHS®	MBHS®HD
Maximum Item Size [mm] ¹ LxWxH	900 x 700 x 500	900 x 700 x 500
Minimum Item Size [mm] ¹ LxWxH	200 x 100 x 10	200 x 100 x 10
Item weight [kg]	0.05 to 60	0.05 to 60
Maximum sorter speed [m/s]	Up to 2.2	Up to 2.5
Sorter Nominal Capacity [cells/h]	6,600	7,212
Carrier pitch [mm]	1,200	1,248
Incline	Up to ±12 degrees	Up to ±15 degrees

¹ Double cell loading is used to transport larger/heavier items.

SORTER INDUCTION

PRECISE LOADING

Merge Belts with low-friction surfaces facilitate smooth transitions between conveyors, preventing jams and maintaining high throughput. Synchronism Belts equipped with direct mounted brushless motors enable precise speed control, aligning items accurately for efficient sorting operations.

Multiple sensors monitor the baggage's position making adjustments to conveyor speeds and sorter cell bookings to ensure safe and accurate loading. Baggage is controlled during the induction, removing any sliding that might provide uncertainty to the true position of the item. This is provided by accelerating the item to the speed of the sorter and with the activation of the sorter cell, it accepts the item at zero speed.

HIGH THROUGHPUT

Designed for efficiency, Inductions support item handling with 30 degrees or 45 degrees induction lines. This capability, combined with adjustable acceleration and speed settings, maximises throughput capacity while maintaining operational stability

ENHANCED STABILITY

The induction system minimises baggage rotation during transfer, ensuring precise item alignment and stability. It features an Orientation Belt that positions items precisely at a 30° or 45° angle, preparing them seamlessly for sorting.

ATR AND RFID INTEGRATION

Induction lines can be integrated with ATR (Automatic Tag Reader) or RFID on induction lines, enhancing baggage tracking accuracy and efficiency. ATR reads barcodes, while RFID ensures seamless identification, even for damaged tags. This benefits tracking, reduces manual intervention, and improves baggage routing, minimising delays in the system.



SUSTAINABLE DESIGN

Leonardo's induction lines use lightweight, low-carbon aluminium to reduce energy consumption and emissions. Recyclable materials are used where possible, minimising waste. Leonardo's commitment to ESG principles ensures that every induction line contributes to a greener, more responsible baggage handling solution for airports worldwide.

ADVANTAGES

- Reversibility to remove non-tracked items automatically
- Photo eyes to monitor item positioning
- For short bursts, capacity may exceed Peak capacity

SYSTEM SPECIFICATIONS

Induction Line	3 Axis	4 Axis	5 Axis	7 Axis
Maximum Item Size [mm] (LxWxH)		900 x 700 x 500		
Maximum Item Size [mm]'(LxWxH)		200 x 200 x 10		
Maximum Item Weight [kg]		60		
Nominal Capacity [item/h]	1500	2500	3000	3500
Operational Capacity [item/h]	1200	2200	2600	3000

For more information:
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