

Intelligent Drivesystems, Worldwide Services



Baggage conveyor technology at Hamburg Airport



Airport conveyor technology with NORD drive units at Hamburg Airport

Over the past few years, the large international airport in Hamburg has been extensively modernised and its capacity considerably extended. Terminal 1 has been rebuilt, the conveyor technology in Terminal 2 has been completely restructured and brought in line with the state-of-the-art, and the gap between the two terminals has been filled with the new Airport Plaza. In view of the increasing number of passengers, efficient organization of transport and storage is essential. Because of this, in the course of the new construction and modernisation, an interlinked baggage conveyor system was designed, which serves all three terminals and can handle and sort up to 8,700 items of baggage per hour. Due to the large volume to be conveyed, it is essential that breakdowns are avoided. At the same time, great demands are made on the transport technology, as this is connected to a computerised logistics system, which pinpoints the location of each item of baggage at all times. Therefore intelligent, high performance and highly flexible drive technology is needed. NORD has implemented this and also fulfills the demands of the customer on its service provider with regard to service and maintenance.

Aviation security requires that passengers and baggage are checked before travel. At international airports, the trend is to transfer baggage checking behind the scenes in order to ensure rapid processing which is as automatic as possible. All control points are integrated into the interlinked Hamburg system. For this, an extremely reliable, low-wear system with high availability was implemented. Standstill times and operating costs have been minimised and each piece of baggage can be precisely followed with a high-performance tracking and tracing system. The space available is optimally used. Early baggage (e.g. baggage which is checked-in the previous evening) is compactly stored and can be quickly fed in for further processing without increased work. Tracking, tracing and automatic sorting enable economic and punctual processing, even with large quantities of baggage.

Automatic baggage transport through all control stages

At the check-in, the baggage is loaded onto the first conveyor belt, where it is weighed and uniquely identified. Behind the 108 check-in desks, the baggage is unloaded onto a common conveyor belt, which transports it for baggage sorting. Passengers only see their baggage again at the destination airport, unless they need to be reunited with their baggage for security reasons. In the baggage hall, out of sight of the passengers, a multi-stage identification and largely automatic security check is carried out. First of all, the labels of all items of baggage, which are assigned at the check-in, are automatically individually scanned and archived for further tracking. Then, without exception, all baggage is subjected to a fully automatic security check, as only baggage which is categorised as completely safe may be loaded onto the aircraft.

Baggage which passes through the control stages without problems is separated via holding sections and acceleration belts, onto sorting carousels, so-called sorters with tipping trays. The acceleration belts must precisely position each item of baggage onto a free tipping tray. To do this, they are linked with the system intelligence. At this point, the system which is equipped with more than 1,000 sensors, knows precisely in which tipping tray each item of baggage is located. At the required time, the relevant tipping tray is unloaded onto a loading table for the correct flight, from where the ground staff then loads the baggage into baggage containers or transport trolleys for loading onto the aircraft.





The entire automated baggage handling is carried out in the basement

Robust, plug-in NORD drive technology makes the system reliable and cost-effective



Sophisticated tracking & tracing architecture

Hamburg Airport handles nine million items of baggage every year. For the baggage handling staff the highest priority is the reliability of the conveyor system and the prevention of faults: The breakdown of even a single component of the system results in a backlog, which means an unacceptable delay.

The baggage handling system includes several kilometres of conveyor belts. In the baggage processing area they are used for combination, feeding, holding and sorting, and are optimally suited for both horizontal and upward and downward transportation. The decentralised drive concept for the conveyor system was designed for a minimum amount of work for wiring and installation. Plug-in integrated NORD trio SK 300E drive units, which can be quickly and simply replaced if maintenance is required, precisely

accelerate and decelerate the conveyors. The frequency inverter is mounted directly on the motor terminal box. A Profibus DP connection allows all control and diagnostic functions to be carried out remotely. In addition, the inverter is equipped with controls for the manual adaptation of direction and speed.

SK 700E frequency inverters are used for the baggage rotators and aligners. These control cabinet devices are designed for the medium to high power range between 1.5 kW and 160 kW and are equipped with POSICON positioning control. They implement independent relative and absolute positioning and therefore provide a cost-effective positioning solution.

Decentralised trio drive units

The trio SK 300E combines the frequency inverter, motor and gear unit and is ideally suited for decentralised and mobile use. The integrated design guarantees simple compliance with common EMC standards and saves costs by eliminating shielded motor cables and if necessary also saves the use of a control cabinet. Basic equipment includes a brake chopper, a mains filter and the control unit for the electro-magnetic brake. The drive units, with a power range from 0.37 to 4 kW and an efficiency of 97% are mechanically robust and resistant to typical sources of faults such as fluctuations of the mains voltage or rapid changes of temperature. The inverters provide protection class IP55 and optionally IP66. They operate in a temperature range from -10 °C to +50 °C and are equipped with full thermal motor protection. Heat dissipation is via the housing, without additional cooling. The drive units provide a typical overload

capacity of 200% for 5 sec. Control and parameterisation are convenient to perform the information retained after it has been entered: As with an "electronic name plate" the data is stored in the NORD motor and can be read out and directly adopted via an exchange unit. The system can also be upgraded with modular I/O and bus interfaces as necessary. The decentralised drives can therefore be coupled to higher-ranking controllers via all common field bus systems, from Interbus via Profibus DP and CANopen/DeviceNet or ASi. For manual control, the SK 300E can be equipped with rotary knobs on the front panel of the inverter, which allow local adjustment of the direction and speed. The functions and fields of application of the low-cost integrated drive units are presented on the Internet page www.sk200e.de





The trio SK 300E is a frequency inverter which is mounted directly onto the motor, with full control and parameterisation functionality. Because of the high protection level of the frequency inverter (IP55, optionally IP66), this makes it a robust drive package for decentralised drive solutions.

SK 200E: The successor of the proven SK 300E.

The new SK 225E and SK 235E versions from the SK 200E series have an onboard AS interface and are available with outputs from 0.25 to 7.5 kW. SK 200E inverters are directly mounted on the geared motor terminal box, in order to create combined, fully integrated drive units for use in the field. For AS-i wiring, only the yellow bus cable needs to be connected. These robust, reliable and economic systems are suitable for large plant installations such as conveyors, and are specially optimised for price-sensitive market segments. For more details visit www.SK200E.de



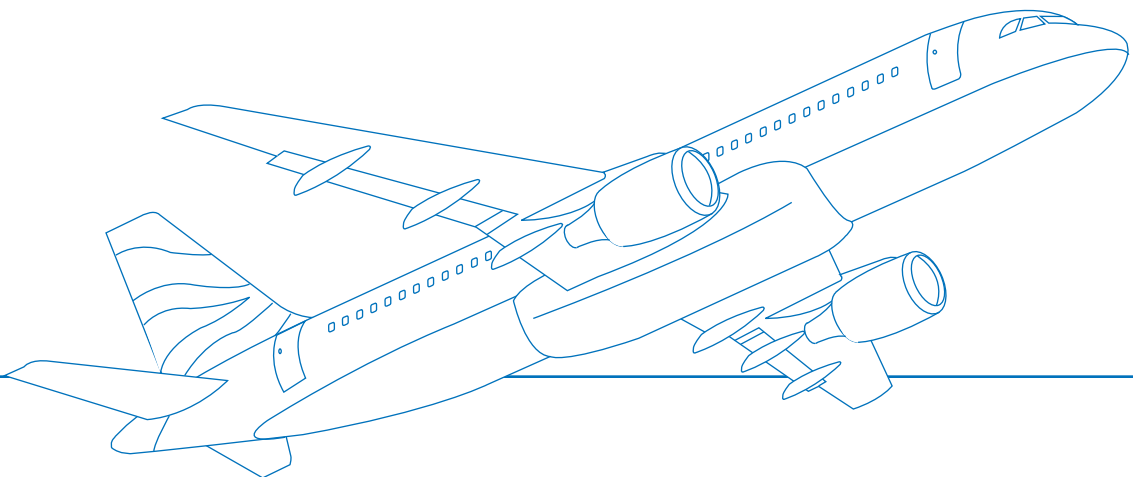
Getriebebau NORD

On-the-fly: New construction and partial modernisation with new drive suppliers

With its extension and modernisation, Hamburg Airport was equipped for the increasing numbers of passengers and quantities of baggage. At present, the airport handles about twelve million passengers per year. A component of the overall concept was to implement a single interlinked baggage conveyor system for the first time. To do this, the conveyor system in Terminal 2 was converted and modernised in 2005 - without interruption to operation. Three years later, the parallel systems were linked to form a single system. The security checks on the baggage are now entirely carried out in the basement. In this way, an innovative, flexible and astonishingly efficient intermediate storage system was implemented. At the same time the future handling of transfer baggage between the various airlines was considerably simplified.

Roger Mest, Electrical Engineering Operations Manager with Real Estate Maintenance Hamburg GmbH (a subsidiary of Flughafen Hamburg GmbH) still considers the conversion during operation to be a remarkable feat for all concerned. With this, NORD did a very good job. The fact that Hamburg Airport is not far from the NORD

headquarters was largely a coincidence. NORD has already equipped many airports throughout the world, including Manchester, Liverpool and Birmingham, as well as Ottawa, Johannesburg and Taipei. Mest sums up: "We selected NORD as an experienced provider of airport equipment. The fact the know-how comes from our area is an extra bonus. It was important for us to have a dependable partner." In the course of the modernisation, the airport company changed its drive unit supplier. Mest: "With the large amount to be handled, we cannot afford breakdowns of the conveyor system. Before the conversion we repeatedly had problems with the drive technology, which sometimes got on our nerves. Although there has been a great increase in the number of drive systems, this now rarely happens, and most faults can be quickly remedied on site. We are very satisfied with the installed technology. Above all, we know that we can handle the increased load and that flights need not be delayed due to failures of the system."





Getriebebau NORD - Company background

With about 2,300 employees, NORD develops, produces and sells drive technologies, and is one of the international leaders in the industry. In addition to standard drives, NORD supplies application-specific concepts and solutions, even for special applications, for example with energy-saving drives or explosion-protected systems. The company, which was founded in 1965, recently achieved a turnover of around 264 million Euro. At present it has over 35 subsidiaries around the world. The closely meshed sales and service network ensures optimum availability for short delivery times and customer-oriented services. NORD produces a wide variety of drive units for torques from 10 Nm to 200,000 Nm, electric motors with powers from 0.12 kW to 200 kW as well as the necessary power electronics in the form of frequency inverters and servo controllers. Inverter solutions are available both for conventional installation in switching cabinets as well as for decentralised and fully integrated drive units.

Company profile: Flughafen Hamburg GmbH

Hamburg Airport was founded in 1911, and is an international airport with its main business in passenger traffic. From Hamburg, 60 airlines now serve 125 destinations. 53 aircraft can be handled simultaneously. In 2008, turnover was 230 million Euro, 12,840 passengers were conveyed and the turnover in air freight was more than 78,000 t. Flughafen Hamburg GmbH is divided into four business divisions: Aviation, Ground Handling, Center Management and Real Estate Management.



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