

Torque Limiters Promote Human Safety in Automatic Door Systems

Exploring friction and ball torque limiter designs in motorized turnstiles, sliding doors and other public-facing systems.

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Without the right mechanical safety measures in place, automated door systems—such as turnstiles, revolving doors and sliding doors—can put human users at risk. These systems are commonly found in commercial and public buildings like airports, shopping centers, hospitals, transit hubs and sports arenas to manage the flow of people, enhance security and provide easy access for individuals with disabilities. As part of the mechanical countermeasures, these systems include torque limiters, which ensure the door always operates within safe limits, preventing accidents.

In addition to safeguarding people, the torque limiters used in automatic door systems protect the equipment itself. Too much torque can damage the motor, gears, and other components in the motorized system, requiring frequent, costly repairs or part replacement. Torque limiters can therefore extend the life of these components by minimizing damage and wear and tear. Their ability to disengage and slip prevents obstructions or obstacles in the door, be it people or items, from continuously straining the motor. Allowing the motor to stop and reset can save both time and money by protecting the equipment and minimizing wear and tear-related downtime.

At ComInTec, we developed torque limiters for use in these mission-critical safety applications. Here's a deep dive into units we made specifically for motorized door systems, including the ways they safeguard both people and equipment during operation.

Automatic systems, which must operate around hundreds to thousands of people each day, can be a recipe for disaster without the proper safety measures in place.



What is a Torque Limiter?

A common power transmission component, torque limiters protect machinery and equipment from excessive torque or overload conditions by limiting the amount of torque transmitted through a drivetrain or power transmission system. If the torque exceeds a predetermined threshold, the torque limiter will disengage or “slip,” interrupting the power transmission temporarily. This function allows the system to reset, resolving the overload condition.

In addition to motorized door systems, torque limiters are found in many industries and equipment, including conveyors, forming machines, winches, agricultural equipment and automotive systems.

Due to their simple yet effective design, torque limiters offer a wide range of benefits:

Reliable operation: Because they rely on mechanical components to detect and limit torque, torque limiters are reliable and easy to maintain. There are no electronic components or complex software systems that can fail.

Cost-effective: Compared to complex electronics, torque limiters are more cost-effective and are typically less expensive to repair or replace.

Immediate response times: As soon as there is a change in torque, torque limiters will disengage the drivetrain almost instantaneously, providing fast protection against overloading, jamming or other hazards.

High load capacity: Torque limiters can handle very high loads and are preferred in a range of industrial applications, including heavy machinery and equipment. Our largest standard units can handle



The EDF/F series is a ball torque limiter, which consists of two halves: a driving member and a driven member that are separated by a set of steel balls housed in grooves on both members.



The DF series is a friction torque limiter, which relies on friction between two surfaces to limit the amount of torque that is transmitted through the system.

up to 120,000 Nm, while standard DF torque limiters can handle up to 23,000 Nm. In typical turnstile applications, the torque required to release the system is quite low to facilitate egress in case of emergency.

The Role of Torque Limiters in Automatic Door Systems

Automatic door systems are one important application for torque limiters. These systems must be able to operate around high volumes of people, providing safety, reliability, robustness and, in many cases, an aesthetically pleasing design. Important for both the protection of the system and the protection of its users, various kinds of doors benefit from torque limiters in different ways.

The torque limiter may slip and disengage because of different causes, one of them being obstructions or detected obstacles. These applications may include motorized turnstiles for people waiting in long lines, public access hatches, walkways, revolving doors, and swing doors, residential gates for private access, sliding or folding doors in automotive and locomotive applications.

Other automated door systems require controlled opening and closing to properly manage foot traffic. These applications that can benefit from torque limiters include tripod turnstiles for checking tickets at events or managing passenger flow in subways, large turnstiles for controlling passenger flow in places that require a high degree of security—such as airports and other transit hubs.

These dynamic systems, which must operate around hundreds to thousands of people each day, can be a recipe for disaster without the proper safety measures in place.

Torque limiters fill this important role by limiting the amount of torque that can be transmitted through the door system. If the torque exceeds the set limit, the limiter will slip, preventing further torque transmission. Torque limiter slippage can prevent automatic doors from becoming immobile and denying access to users or potentially trapping them.

ComInTec Torque Limiters

ComInTec developed two units—the DF friction torque limiter and EDF/F ball torque limiter—which feature a compact and easy-to-install design, high durability, and minimal maintenance even after a high number of cycles. These components can also be integrated into existing door systems without altering the design, keeping uptime high.

The DF series is a friction torque limiter, which relies on friction between two surfaces to limit the amount of torque that is transmitted through the system. The basic design consists of two rings, which are mounted on either side of the drive shaft. If the transmitted torque exceeds the threshold, the material between the plates will begin to slip, which stops the load from rotating and prevents damage to the drive unit. In motorized door applications, the DF series provides end-of-stroke slippage, quietly intervening without disconnecting the movement.

Additional features include a simple, economic mechanical design, silent overload without vibration, protection in both rotation directions, asbestos-free friction discs, precise torque-setting via adjusting the locking ring, and up to 23 kilonewton-meters (KNm) of torque and 140 mm bore diameters.



Torque limiters fill an important role by limiting the amount of torque that can be transmitted through the door system.

The EDF/F series is a ball torque limiter, which consists of two halves: a driving member and a driven member that are separated by a set of steel balls housed in grooves on both members. When the input shaft rotates and exceeds the torque limit, the balls are forced out of their grooves, causing the driving member to slip past the driven member, stopping the transmission. In motorized door applications, the EDF/F series will switch off the control motor to the system in the event of an accidental impact. It will also allow the unlocking of the movement in emergency situations.

Additional features of this unit include reduced torsional backlash by the ball drive, maintenance-free for long-lasting operation, use in damp and oily environments, and up to 1,450 Nm of torque and 55 mm bore diameters.

Learn More About Torque Limiters

Torque limiters like the DF and EDF/F series provide reliable, cost-effective protection against torque-related hazards in a wide variety of machinery. At the same time, their mechanical simplicity, immediate response time and high load capacity make them a popular choice for maintaining safety in motorized door applications.

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