Door openers for public passenger rail service

SIDOOR – the intelligent door management system
Every day, hundreds of millions of people worldwide use public transport systems. In large cities, public transport is frequently the only way to get from one place to another quickly and inexpensively. Although public transport is becoming more and more attractive as the volume of road vehicle traffic incessantly rises, it also poses major infrastructural requirements for short- and long-distance rail-mounted systems.

This is where SIDOOR comes into play. The innovative drive systems from Siemens for automatic platform screen doors offer much more than just a high level of safety: they also enhance the convenience for all stakeholders.

Platform screen doors are becoming indispensable
Railway stations today face difficult conditions for rail transport services. In addition to posing potential hazards for passengers and train drivers, platforms also are bottlenecks in the logistical people-moving processes of rail services. Passengers expect a high measure of convenience.

At the same time, metro operators are increasingly turning to automated train lines with platform barrier systems to increase efficiency and reliability. Platform screen doors, or PSD for short, are thus becoming an indispensable part of such installations, ensuring passenger safety as well as convenience. Platform screen doors that serve as a barrier between the railway track and the platform enable passengers to board and exit trains safely.

In addition to protecting passengers, these platform screen doors provide many other benefits: They enable rail operators to increase the frequency of trains and optimally coordinate passenger loading and unloading, thus saving time. Such barrier doors also allow climatic conditions in stations to be significantly better controlled, enhancing passenger comfort.
The control unit and drive together form an integral, perfectly coordinated system. Operating data acquisition, parameterizing, and monitoring are performed via the TIA Portal engineering framework.

SIDOOR complete solutions

In addition to the actual investment decisions, it’s the implemented technology that decisively influences rail system installations. There’s a basic rule among rail operators: Solutions must be economical but must also function fault-free over long periods of time. SIDOOR from Siemens, supporting the trend to equip railway stations with platform screen doors, is geared for use in a broad range of platform barrier systems.

SIDOOR, with its new door drive solution consisting of a SIDOOR ATE53xS controller combined with an EC direct-drive MED280 unit or an EC geared motor MEG251, meets these goals perfectly. The SIDOOR product family, which includes all necessary accessory components, offers complete solutions that are convincing from both a technical and a financial standpoint. Users benefit at the same time from the extensive range of support services, including numerous application examples, support documents, and online support (www.siemens.com/sidoor).

The new ATE530S door controller communicates via PROFINET with the superordinate control system. It works with EC motors to create a versatile, complete, high-performance system. The ATE53xS and ATE530S door controllers of the SIDOOR family are intelligent door drives that enable safe and secure operation of platform screen doors (PSD) and platform screen gates (PSG), based on individual requirements and safety requirements. The EC motor technology used ensures high reliability and requires no maintenance.

Features of SIDOOR ATE530S platform screen door controller
- Use of standard components of automation technology
- Full integration in the TIA Portal by means of General Station Description (GSD) files and the function modules provided
- Adaptable output of an unlocking sequence
- Individually parameterizable behavior in case of obstruction and dynamic obstruction detection
- Sequential control for intelligent switching between offline operation, service operation, and remote operation
- Support from travel limit sensors
- Safe and reliable restriction of the forces and energy that the user may select (with factory settings of 150 N and 20 J in the as-delivered condition)

Main components:
- Door controller: SIDOOR ATE530S
- Motor: SIDOOR MED280 or, alternatively, SIDOOR MEG251
- Power supply unit: SIDOOR transformer (e.g. SITOP PSU300S 20A)

Mechanical accessories:
- Motor holder
- Mounting bracket
- Door clutch holder
- Deflector device
- Toothed belt
**Features and functions**

- Expandable I/Os by means of SIMATIC components
- Standardized communication interface
- Safe and reliable inputs via non-equivalent signals directly at the controller
- Software updating and learn run via PROFINET as well as friction compensation
- Automatic maintenance algorithm that identifies, analyzes, and signals changes in system friction
- Individually parameterizable behavior in case of obstruction and dynamic obstruction detection
- Adaptable behavior of an unlocking sequence

**Benefits**

- Number of I/Os varies per project. Every platform screen door project can be custom fitted
- Consistent, end-to-end system communication for the entire platform via PROFINET
- Safe and reliable opening and closing of doors
- Reduced commissioning times
- Predictive maintenance –> precise forecasting of soiling, damage, and wear
- Versatile adaptation of the system to meet the project requirements
- Control actuation of a broad number of differing unlocking mechanisms

Electronically commutated (EC) motors – technology for dynamic door weights of up to 280 kg – low-noise, low-heat, and maintenance-free

Commissioning and maintenance performed by superordinate system controller

Protective cover available optionally, with expanded temperature range up to +70 °C

Field bus connection via PROFINET to SIMATIC SPS, and thereby expanded inputs and outputs via standard SIMATIC components

Certified to:
- IEC 62061 – Safety Integrity Level (SIL) 2 for specified functions
- EN 60950
- EN ISO 13849-1
- EN 14752 (force and energy)

The screwless housing design enables the housing to be opened and closed without any tools, and fitted with plug-in terminal connections, thereby reducing installation time.

Five inputs and two outputs are individually configurable with the aid of “FBLOCK” function units

Certified to:
- IEC 62061 – Safety Integrity Level (SIL) 2 for specified functions
- EN 60950
- EN ISO 13849-1
- EN 14752 (force and energy)
Application examples

**Application example SIDOOR Mobility – Platform screen door (PSD) with PROFINET/PROFIsafe**

- **Station Control Room**: SIMATIC S7-1500 Fail-safe Controller, SIMATIC HMI.
- **Global hardwired Door Control**: PROFINET.
- **Local Control Panel**: SIPLUS ET 200SP RAIL, SIDOOR ATE53xS, SIDOOR MED280.
- **Actors/sensors**: Platform, Door 1 to Door n.

**Application example SIDOOR Mobility – Platform screen gate (PSG)**

- **Station Control Room**: SIMATIC S7-1500 Fail-safe Controller, SIMATIC HMI.
- **Local hardwired Door Control**: PROFINET/PROFIsafe.
- **Local Control Panel**: SIPLUS ET 200SP Fail-safe, SIDOOR ATE53xS, SIDOOR MEG251.
- **Actors/sensors**: Platform, Gate 1 to Gate n.
## Controllers

<table>
<thead>
<tr>
<th>Controller</th>
<th>MLFB</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIDOOR ATE530S</td>
<td>6FB1231-3BM10-7AT0</td>
<td>Controller for platform screen doors, horizontal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• With PROFINET module</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SIL 2 in accordance with IEC 62061</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fully automated learn run with automatic friction, door width, and weight determination</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Individually parameterizable behavior in case of obstruction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Sequential control for intelligent switching between offline operation, service operation, and platform (remote) operation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Door widths ranging from 35 cm to 5 m</td>
</tr>
<tr>
<td>SIDOOR ATE530S coated</td>
<td>6FB1231-3BM12-7AT0</td>
<td>• Features as above, plus</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– transparent protective cover*</td>
</tr>
<tr>
<td>SIDOOR ATE531S</td>
<td>6FB1231-3BM11-7AT0</td>
<td>• Features as above, plus</td>
</tr>
<tr>
<td>(depicted without cover)</td>
<td></td>
<td>– transparent protective cover*</td>
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<tr>
<td></td>
<td></td>
<td>– temperature range extended up to +70 °C</td>
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</tbody>
</table>

## Motors

<table>
<thead>
<tr>
<th>Motor</th>
<th>MLFB</th>
<th>Feature</th>
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<tbody>
<tr>
<td>SIDOOR MED280</td>
<td>6FB1203-0AT12-7DA0</td>
<td>• Gearless EC direct-drive motor for door weights of up to 280 kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Only one motor for various mounting directions</td>
</tr>
<tr>
<td>SIDOOR MEG251 right-handed</td>
<td>6FB1203-5AT01-7MP0</td>
<td>• EC geared motor for door weights of up to 250 kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• For retrofit applications (replacement for SIDOOR ATE250S, including SIDOOR MEG250)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Right-handed gearing</td>
</tr>
<tr>
<td>SIDOOR MEG251 left-handed (no image)</td>
<td>6FB1203-5AT00-7MP0</td>
<td>• Features as above, but with left-handed gearing</td>
</tr>
</tbody>
</table>

## Power supply

<table>
<thead>
<tr>
<th>Power supply</th>
<th>MLFB</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIDOOR Transformer</td>
<td>6FB1112-0AT20-2TR0</td>
<td>• Single-phase 230 V AC (±15%), 50/60 Hz, IP54</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Including 1.5-meter-long connecting line to control unit</td>
</tr>
<tr>
<td>SITOP PSU300S 20A</td>
<td>6EP1436-2BA10</td>
<td>• Three-phase 340 to 550 V AC, 50/60 Hz, IP20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Only in conjunction with line circuit breaker 10KA 1POL C8, e.g. SENTRON 5SY4108-7XX11 for rail applications</td>
</tr>
<tr>
<td>SIPLUS PSU300S 20A</td>
<td>6AG1436-2BA10-7AA0</td>
<td>• Features as above, additionally for medial loads ranging from –25 °C to +70 °C</td>
</tr>
</tbody>
</table>

*Compliant with EN 50155, Sections 12 and 9.4: to prevent any functional impairment or damage due to humidity and atmospheric pollutants.*
SIDOOR PROFINET communication

With its SIDOOR innovative door control system, Siemens demonstrates once again just how simple integration can be. By using field bus communication via PROFINET, SIDOOR drives can be easily integrated into the more secure and reliable automation environment, for instance of an SIMATIC S7-1500 controller with its Safety Integrated functionality, and thus into the rail operator’s instrumentation and control system.

The system thereby adapts to its specific environment, and can be easily commissioned and put into operation thanks to the Totally Integrated Automation Portal (TIA Portal). The TIA Portal provides you with unrestricted access to our complete range of digitalized automation services, from digital planning and integrated engineering to transparent operation. This minimizes overall engineering effort.

These solutions are also extremely maintenance-friendly, even during ongoing operation. System messages and alarms are reported by fail-safe buffering, and can be centrally evaluated. This enables predictive maintenance, facilitating ease of operation and servicing. The SIDOOR door control systems are designed with two PROFINET ports so that all components can be connected together to form a fail-safe loop structure. All doors can be centrally controlled via this central data line.

The drives can thus be quickly connected together in series with the central periphery stations SIPLUS ET 200SP RAIL from Siemens, for example.

SIDOOR ensures safety and reliability

The drives for platform screen doors must work safely and reliably. That is why the control and drive solutions from Siemens focus sharply on these two aspects. The SIDOOR ATE530S controller is equipped with comprehensive safety functions certified by the German TÜV-authorized inspection agency:

- Safe Torque Off (STO)
- Safe and reliable application of force
- Safe and reliable compliance with specified speed
- Safe and reliable input and reading of digital control signals

The safe torque off function is thus quickly programmed, allowing individuals to easily free themselves in the event of a system malfunction. During normal operation, the door control system is also designed to provide continuous door monitoring and to approach obstruction locations slowly. It likewise offers the possibility of freely configuring the system’s behavior in the event of an obstruction, such as the parameterizable reversing distance in the open and closed directions.

SIDOOR also supports automatic reopening of platform screen doors (reversing). The force and energy restrictions allow rapid door movements even with heavy doors.

What’s more, the control system is certified EN 60950, EN ISO 13849-1 (fail-safe function) and EN 14752 (force and energy).

Parameterization

The door control parameters are entirely configured and evaluated by the engineering system. The manufacturer supplies appropriate function modules that enable simplified handling and quick adaptation to the given application. The engineering framework STEP 7 in the TIA Portal is used to integrate the function modules. This serves to minimize the engineering effort needed for platform screen door systems. Handling with these complete, integral solutions is easy and convenient – in fact, firmware updates of the SIDOOR control system can even be carried out via TCP/IP, which means that there is no need for a service technician to perform these updates on-site.

Hazardous situations can never be entirely ruled out. Intelligent safety solutions offer reliable protection.
Subject to changes and errors.
The information provided in this document contains merely general descriptions or characteristics of performance which in case of actual use do not always apply as described or which may change as a result of further development of the products. An obligation to provide the respective characteristics shall only exist if expressly agreed in the terms of contract.

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