



Sliding Door Automation

For escape routes and emergency exit



Certified automation in compliance with the European standard **EN 16005** *Motorized Pedestrian Doors – Safety in use – Requirements and test methods* – entry into force in Italy on the 22 November 2012 and included in the list of harmonized standards of Machinery Directive (2006/42/CE) published in the Official Journal of the European Union with with the announcement 2013/C99/01 of the 5 April 2013.

The European Standard 16005 specifies the design requirements and test methods for motorized pedestrian doors used in both internal and external doorways and in escape routes. At the point 4.7.2 it provides additional requirements for motorized pedestrian door sited in escape routes and emergency exits. These requirements are in their entirety observed by FACE.

The application of the standard by the manufacturer grants the legal compliance presumption to the essential requirements of security provided in the Machinery Directive, therefore any national regulation in contrast with it has to be considered abrogate.

The main advantage arising from this regulation is the possibility to install approved automations with standard sliding leaves in escape routes and emergency exit, in place of traditional sliding doors with break-out system in correspondence to the emergency exit direction.

This condition allows to obtain a series of important benefits:

1) They can be used in plate glass leaves in addition to any type of sliding door or window. This prevents the inadvertent collapsing of the leaves caused by people during the transit out of the room (shopping carts in supermarkets and mall, luggage in airports, stretcher and wheelchair in hospital, etc.) which involves the stop of the automation and requires a subsequent action for reinstatement / resetting of the system.

2) It avoids dangerous situations provoked when people try to break through the doors that are moving transverse to the thrust direction; doors opened in such a way might hit other people or things in the outer area.

3) It is facilitated the emergency exit for people with disabilities by avoiding the direct contact with the leaves as they are already open.

4) Great decrease in time and implementation costs of the mechanical break-out system on sliding doors leaves and fixed side walls to break them as a swing door.

5) In case of one or two doors automation without fixed walls, it is not necessary to install the automation in the outer side of the room.

6) Comparing the costs:

- A complete installation of Advanced automation (standard) + security accessories + break-out sliding leaves in the emergency exit direction.

- With a complete installation of Emergency automation for escape routes and emergency exit EN 16005 + security accessories + standard sliding leaves.

It turns out that installing an Emergency automation EN 16005 you get an average savings of 25%.

TECHNICAL DESCRIPTIVE SECTION OF SECURITY FEATURES

1 INTRODUCTION

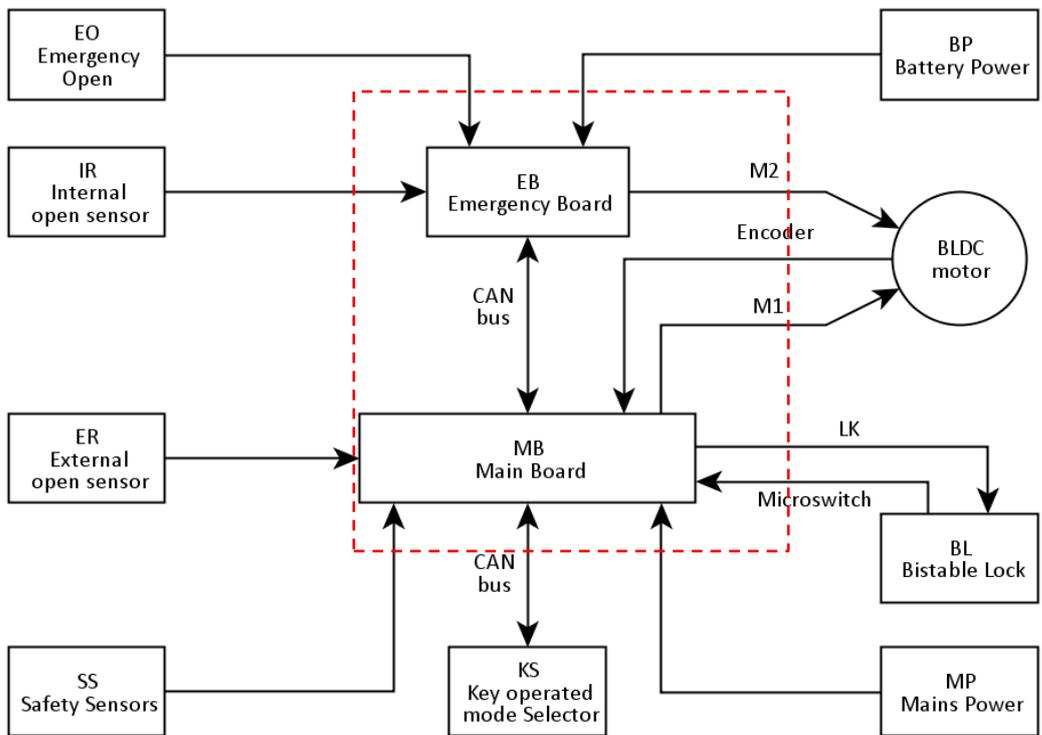
1.1 General description. The SL4, SL5 and SLT (telescopic) series pedestrian sliding doors are intended for use in normal and in escape routes passages. The doors can be one or two wings. The doors are equipped with a brushless d.c. electromechanical drive. A control board manages the sensors, determines the functions depending on the selected mode of operation, and drives the motor by a PWM solid state circuit. The position and the speed of the wing is determined using an angular encoder based on magnetic field sensing. The door will be operated in different ways:

- . Operator for normal installations
- . Operator with a double winding motor for escape routes

1.2 **Usage and certifications.** The SL4, SL5 and SLT (telescopic) series are designed for residential and commercial applications. The applications are according to the European norm EN 16005, and to the German norm DIN 18650 regarding the Powered Pedestrian Doors. For escape routes operator the applications shall be according to the German norm AutSchR.

2 OPERATORS AND COMPONENTS

2.1 **Architecture of the operator.** The following figure describes the architecture of the operator for escape routes, in terms of power sources, sensor inputs, control unit (Main board plus Emergency Board) and drive unit.



2.2 **Motor.** A brushless DC motor is used, that drives the belt without gearbox. A sophisticated control of the motor is used to optimize torque and increase the efficiency. The position sensor, mounted on the cap of the motor, is used to detect position and speed of the wings. The motor have two, completely independent three-phase winding system. This solution, together with the electronics, guarantees the ability of opening the door in any condition of electrical fault. Even the position sensor is not necessary during the emergency opening. The performance of each winding system is periodically checked, thus giving the ability to move the door properly.



2.3 **Electronic unit.** The electronic unit is, for the installer, one unique unit, and he is not required to make complex cabling between different boards, thus giving a very simple and easy to understand system. Internally, the electronic unit is made of a main board including:

- a switch mode power supply, that can accept an input varying between 100 and 240 Vac nominal;
- a main logic unit with a 32 bit microcontroller, that manages all the input commands and the outputs, in particular the I/Os related to safety functions;
- a three-phase motor driving circuit;
- communication ports, in particular a CAN port for local communication with other electronic units of the door;
- a human interface, with a four alphanumeric characters LED display and four push buttons, for the setting of all the parameters of the system.

An emergency card mounted on the main board.

An additional emergency board is connected onto the main board. The main board and the emergency board are connected by a CAN based serial communication, but the emergency board is completely independent from the main board, has its own microcontroller, manages an intrinsically safe movement sensor for the opening of the escape route, and supervises the operation of the main board. It can drive autonomously the motor, to achieve the emergency opening of the wings.

2.4 **Additional power supply.** The additional power supply is obtained from a battery kit based on a 12 V battery, and is available as soon as the mains power supply fails. The battery kit voltage is thus able to power the motor driving circuits in order to move the door in open, since a power supply failure is to be considered an emergency condition. Normally the battery is kept charged and periodically tested to guarantee its efficiency. In case of battery failure or low charge, the drive operates in state of emergency opening.

2.5 **Bistable lock.** The bistable lock has a mechanical feature, that makes it able to remain in both the locked or unlocked position, without a permanent current. The change from one position to the other is achieved by temporarily driving the coil of the lock, with a suitable current. In escape routes the door shall never be locked, except when the emergency function is disabled, like “door closed”. A microswitch is used to monitor the position of the lock and its proper transition locked-unlocked, thus detecting any failure that could involve the locking system, and compromise the safety of the door in terms of emergency.

2.6 **Function selector.** The electronic function selector has a capacitive touch panel with proper symbols, to change the function of the door, depending on the needs for the entrance/exit. In an emergency door, the function selector must be protected against unintentional change of function by unauthorized person, since this could lead to a loss of safety. Protection is achieved by a RFID key, whose code is recognized if previously stored in the system, and enables the selector to change of function.



3 SAFETY FUNCTIONS OF THE OPERATOR

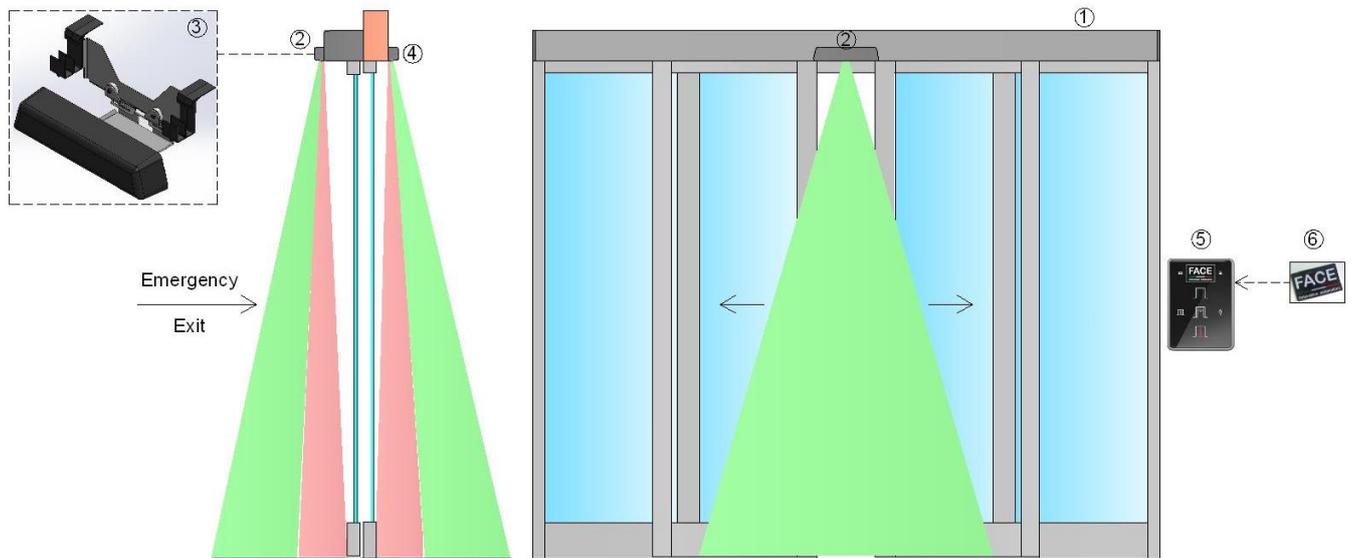
- 3.1 **Functional Safety.** Referring to the Machine Directive 2006/42/EC, to the European norm EN 16005 and to the German norm DIN 18650, it is mandatory to comply with EN ISO 13849 regarding the Functional Safety. It is then necessary to identify and specify the safety functions of the door. The SL5E series presents the same features of a normal door, where the Functional Safety is related to the safety of the users passing through the door. Basically a force limitation is provided to avoid injuries in case of contact between the users and the wings, but this is not sufficient in several environments. As a safety function, presence sensors shall be used to prevent contact (“collision prevention”) both in closing and in opening direction. The norm EN 16005 requires a Performance Level “c” for this safety function. In emergency doors the Functional Safety, in addition to the features of a normal operator, requires the emergency opening by the internal sensor, and in any case of failure like a failure on power supply, in order to guarantee the proper evacuation of the place in a condition of panic. The norm EN 16005 requires a Performance Level “d” for this additional safety function.
- 3.2 **Safety function “Collision prevention”.** Monitored presence sensors avoid contact during closing or opening maneuver, by slowing down or stopping the movement. A failure detected in closing presence sensors determines stopping the door. A failure detected in opening presence sensors determines low speed / stop of the door when approaching to open position. A failure detected in the remaining parts of the safety function determines de-energizing the drive unit.
- 3.3 **Safety function “Emergency opening by internal sensor”.** Intrinsically safe movement sensor (that must be approved for this application according to European Norm EN 12978) in the inner side of the operator shall detect people in the direction of the escape route, and shall open the door. This function shall not operate when the operation mode of the door is “door closed” (also called “off” or “locked”). This is why the operation mode can be changed only by authorized people, by mean of a RFID key in our function selector.

4 DIAGNOSTIC METHODS

- 4.1 **General requirements.** Diagnostic methods are intended to detect failures with different periodicity: according to EN 16005, an electrical failure preventing normal operation shall be detected in maximum 15 s, while a 24 h test is used to check the emergency opening function in escape routes.

<i>Diagnostic method description</i>	<i>Diagnosed blocks</i>	<i>Diagnostic test Interval</i>
<i>Power Supply Diagnostics</i>	<i>Power supply</i>	<i>15 s</i>
<i>Battery Diagnostics: presence</i>	<i>Battery</i>	<i>15 s</i>
<i>Battery Diagnostics: efficiency/charge level</i>	<i>Battery</i>	<i>24 h</i>
<i>Motor windings</i>	<i>Motor driving</i>	<i>24 h</i>
<i>Lock position Diagnostics</i>	<i>Lock</i>	<i>15 s</i>
<i>CAN bus communication</i>	<i>Communication</i>	<i>15 s</i>
<i>Digital Input Diagnostics (internal open sensor)</i>	<i>Digital input block</i>	<i>15 s</i>
<i>Digital Input Diagnostics (safety sensors)</i>	<i>Digital input block</i>	<i>15 s</i>

EXAMPLE OF AUTOMATIC SLIDING DOORS SYSTEM WITH TWO SLIDING LEAVES FOR ESCAPE ROUTES AND EMERGENCY EXITS IN COMPLIANCE WITH EN 16005



Rif	Code	Description
1	SL4E220 > 266	Automation SL4E (Emergency) for doors with 2 sliding leaves
	SL5E220 > 266	Automation SL5E (Emergency) for doors with 2 sliding leaves
	SLTE230 > 266	Automation SLTE (Telescopic-Emergency) for doors with 2+2 sliding leaves
1	SL5BD2	Battery power device for emergency operation, inside the automation
1	SL5LD	Bistable locking device, complete with release handle, optional device, inside the automation
1	SL5SL	Signaling device lock position, optional device, inside the automation
2	OSD2, OSD4	Mono-bidirectional sensor for opening the door in escape routes and emergency exits, approved EN16005
3	SL5FS	Device for fixing sensor to the automation
4	OSD1, OSD3	Mono-bidirectional safety sensor for opening the door, approved EN16005
5	FSD1	Electronic functions selector
6	TB1	Proximity transponder badge

TECHNICAL FEATURES OF THE AUTOMATION

Series	SL4E	SL5E	SL7E
Model	EMERGENCY	EMERGENCY	TELESCOPIC-EMERGENCY
Use	Sliding doors automation	Sliding doors automation	Telescopic sliding doors automation
Special Applications	Emergency routes and exits without break-out system	Emergency routes and exits without break-out system	Emergency routes and exits without break-out system
Approved EN 16005 + DIN 18650	TÜV THÜRINGEN	TÜV THÜRINGEN	TÜV THÜRINGEN
Dimensions mm	156 x 125 x max 6600	156 x 125 x max 6600	216 x 125 x max 6600
Load	100 kg one leaf 180 kg two leaves	140 kg one leaf 240 kg two leaves	100 kg two leaves 280 kg four leaves
Maximum opening and closing speed:	0,8 m/s one leaf 1,6 m/s two leaves	0,8 m/s one leaf 1,6 m/s two leaves	0,8 m/s two leaves 1,6 m/s four leaves
Duty class	Continuous operation	Continuous operation	Continuous operation
Intermittent operation	S3 = 100%	S3 = 100%	S3 = 100%
Traction	Direct drive brushless motor	Direct drive brushless motor	Direct drive brushless motor
Power supply	Extended range 100-240 V 50/60 Hz	Extended range 100-240 V 50/60 Hz	Extended range 100-240 V 50/60 Hz
Rated power	70 W	70 W	70 W
Stand-by	10 W	10 W	10 W
Rated load	150 N	150 N	150 N
Protection rating	IP 20	IP 20	IP 20
Parameter settings	Buttons and display	Buttons and display	Buttons and display
Memory for settings and saving	Micro SD standard	Micro SD standard	Micro SD standard





Innovate to simplify

CE MARKING AND EUROPEAN STANDARD EN 16005



FACE automations are CE-marked designed and built in compliance with the European standard safety requirements EN 16005 and the following European directives: Machinery Directive (2006/42/EC), Electromagnetic Compatibility Directive (2004/108/EC).

To make the system, use accessories and safety devices approved by FACE.

FACE reserves the right to make changes and improvements of their products. For this reason, the illustrations and the information appearing in this document are not definitive.

This edition of the document cancels and replaces all previous versions. In case of modification will be issued a new edition.

More information is available on-line technical manuals www.facespa.it.

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