

Technical product description
High-speed spiral door
for parking and garage systems



This technical product description applies exclusively to
the following door type:

EFA-SST® PS-N

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Table of contents

1	Short description.....	4
2	Technical properties.....	5
3	High-speed spiral door construction.....	7
4	Door safety.....	19
5	Equipment.....	20

1 Short description

Fig. 1: High-speed spiral door for parking and garage systems

The EFA-SST PS-N has been specially developed for parking and garage systems. The basic construction is based on tried and tested spiral door technology. The door leaf with its 105 mm high aluminium slats makes for minimum lintel height requirement.

2 Technical properties

Use

Use

- Industrial door
- Hall door
- Parking systems
- Garage door

Area of application

- Door for outdoor and indoor use

Temperature for use

- -15 °C to +50 °C

Fig. 2: Use

	Outdoor (-15 °C to +50 °C)
	Indoor (+5 °C to +50 °C)

Dimensions

Data	Value	Unit
Door width	800-4000	mm
Door height	1000-4000	mm

Fig. 3: Diagram of possible door heights and door widths

Speeds

Variant with safety strip

Item	Value	Unit
Opening speed	approx. 1.2	m/s
Closing speed	approx. 0.5	m/s

Variant with light grid (optional)

Item	Value	Unit
Opening speed	approx. 1.2	m/s
Closing speed	approx. 1.0	m/s

Technical properties

Performance properties as per DIN EN 13241-1

Item	Value
Resistance to wind load as per DIN EN 12424	Class 4
Resistance to water penetration as per DIN EN 12425	Class 0
Permeability to air as per DIN EN 12426	Class 0
Airborne sound insulation as per EN ISO 717-1 (aluminium slat only)	Rw = 23 dB
Thermal insulation as per DIN EN 12428 (with door 4000 x 3500) (aluminium slat only)	U = 6.6 W/m ² K

Fire performance as per DIN 4102

Data	Value
Material class	B2 normally inflammable

Applied safety standards

The following standard was applied for planning, engineering and production: DIN EN 13241-1 Doors – Product standard

Performance

Data	Value
Load changes per year	200 000
Service life	10 years

3 High-speed spiral door construction

Fig. 4: Assemblies

1	Frame sides with horizontal door leaf guidance, door leaf toothed belt and support	↳ <i>'Transmission in horizontal beam frame side'</i> on page 8
2	Consoles, synchronous shaft; bearing, reinforcement profile, panelling (optional)	↳ <i>'Consoles'</i> on page 9 ↳ <i>'Panelling'</i> on page 9
3	Frame sides with vertical door leaf guidance, counterbalance and safety devices (light barriers and door light grids)	↳ <i>'Vertical frame sides with door guidance'</i> on page 10 ↳ <i>'Counterbalance'</i> on page 11 ↳ <i>'Safety strip and light barrier'</i> on page 19 ↳ <i>'Door light grid (optional)'</i> on page 19
4	Door leaf	↳ <i>'Door leaf'</i> on page 13
	Slats	↳ <i>'Slat'</i> on page 13 ↳ <i>'Viewing slat (optional)'</i> on page 14 ↳ <i>'Ventilation slat (optional)'</i> on page 14
	Safety strip	↳ <i>Chapter 4 'Door safety'</i> on page 19
5	Drive	↳ <i>'Drive'</i> on page 16
6	Control unit	↳ <i>'Control unit'</i> on page 17 ↳ <i>'Control unit (optional)'</i> on page 18

Transmission in horizontal beam frame side

Fig. 5: Transmission

The horizontal frame sides are made up of bevelled sheet metal profiles and an aluminium guide and are fitted to the ceiling with supports. Protection from reaching in to prevent finger injuries is provided by low-wear door leaf seals.

The transmission of force from the drive to the door leaf is performed by the synchronous shaft (Fig. 5/1), the continuous toothed belt (Fig. 5/2) and the door leaf mount (Fig. 5/3) on the top door slat. Unlike a chain, the toothed belt runs very quietly.

Consoles

Fig. 6: Console

The consoles consist of a synchronous shaft with bearing (Fig. 6/1), bevelled main supports (on both sides) (Fig. 6/3) and a guide (Fig. 6/2).

Panelling

The lower area between the two consoles can be covered with optional sheet metal panelling.

Panelling on the hanging box as a protective guard is regulation for doors with a height of less than 2500 mm.

Fig. 7: Panelling

Vertical frame sides with door guidance

Fig. 8: Vertical frame side with vertical door guidance

The frame sides are each made up of one main bevelled sheet metal profile and one bevelled sheet metal cover profile. The door leaf guide which is made of sheet metal and aluminium profiles, is on the inside. The sheet metal cover profiles are fastened with screws. Optionally they can also be supplied in a hinged, pivoting design.

Counterbalance

Fig. 9: Counterbalance

The door leaf counterbalance is a back pull mechanism: Tension springs (Fig. 9/1) are installed in the side frames. The tension springs are connected to the synchronous shaft (Fig. 9/3) by heavy-duty belts (Fig. 9/2). The tension springs are tensioned when the door is closed and relaxed when the door is open.

This way the door can also be opened by hand (without electrical power) in case of emergencies. In normal mode the motor is assisted by the force of the tension springs.

The spring tension is calculated for each individual door.

Emergency lever

Fig. 10: Emergency lever

- 1 Emergency lever
- 2 Door locking lever

The emergency lever is situated on the frame side or optionally on a separate console. When the lever is pulled, the drive brake is enabled and the door is opened in part automatically by the tension springs of the counterbalance system. The door can be opened completely by pushing the door leaf upwards. The control unit is in EMERGENCY STOP status during this operation.

Door locking mechanism

Fig. 11: Door locking mechanism

The mechanical locking mechanism is installed in the vertical frame side on the motor side. The locking mechanism handle keeps the door leaf closed so that it is safe from break-ins. The door locking mechanism is operated using a lever which is fitted in the door frame.

Door leaf

Fig. 12: Door leaf

The door leaf is assembled from slats (Fig. 12/3) which are held at the correct spacing by hinge chains (Fig. 12/2) attached at the sides. This spacing prevents contact between the slats. They are thus free from wear. The forces for opening and closing the door are transmitted via hinges.

Ball-bearing mounted rollers (Fig. 12/1) keep the door leaf firmly in the guides in the horizontal direction. The slats are connected by rubber hinge profiles.

This homogeneous door leaf construction ensures the very good running performance and the high running speed.

Slat

The aluminium slats are made of a double-walled extruded profile.

Dimensions	20 x 105 mm
Finish	Anodised E6/EV1
Optional	Powder coating, colours as per RAL

Fig. 13: Slat

High-speed spiral door construction

Viewing slat (optional)

The viewing slats comprise transparent plastic panes pressed into the aluminium profiles.

Dimensions	20 x 105 mm
Finish	Anodised E6/EV1
Glazing	SAN panes Polycarbonate panes
Optional	Powder coating for aluminium profiles, colours as per RAL

Fig. 14: Viewing slat

Ventilation slat (optional)

The ventilation slats comprise aluminium metal sheet with elongated holes (50x6 mm) which are pressed into the aluminium frames.

Dimensions	20 x 105 mm
Finish	Anodised E6/EV1
Vent cross section	$LA = ((B-0.110) * 0.020) * \text{number of slats}$
Optional	Powder coating for aluminium profiles and ventilation sheets, colours as per RAL

Fig. 15: Ventilation slat

The number of viewing slats and ventilation slats is limited.

Sealing

Fig. 16: Sealing

The plastic low-wear door leaf seals provided a vertical sealing effect. The rubber profiles perform this function in the horizontal direction. The slats are sealed off by rubber hinges one below the other.

High-speed spiral door construction

Drive

Depending on the installation situation the drive can be attached on the side, next to the console (standard) or underneath the console (optional).

Drive type	Direct mount drive Spur gear asynchronous AC motor
Power classes	1.1 kW / 120 Hz
Protection type	IP 54
Position detection	Absolute value transmitter

Fig. 17: Drive on the side of the console

Fig. 18: Drive underneath the console

Control unit

- 1 Control unit mount
- 2 Control unit

Control unit	EFA-CON® with frequency converter
Size	530x160x160 mm
Housing	Polycarbonate housing
Protection type	IP65
Viewing window for display screen	
Operating control	OPEN-STOP-CLOSE (control cabinet front) Emergency stop master switch
Supply voltage	230 VAC +/- 10 %
Frequency	50-60 Hz
Supply line	Fuse protection of 16 A to be provided by the user (K characteristic)
With residual-current circuit breaker (RCCD) as necessary	300 mA as per DIN VDE 0100-530 (sensitive to universal current)
Standard installation position	On the side of the frame side on the motor side at eye level Or on the side, next to the frame side on a mounting bracket

Fig. 19: Control unit

High-speed spiral door construction

Control unit (optional)

Control unit	EFA-CON® Industrial with frequency converter
Size	380x380x210 mm
Housing	Steel (V2A on request)
Protection type	IP65
Viewing window for display screen	
Operating control	OPEN-STOP-CLOSE (control cabinet front) Emergency stop master switch
Supply voltage	230 VAC +/- 10 %
Frequency	50-60 Hz
Supply line	Fuse protection of 16 A to be provided by the user (K characteristic)
With residual-current circuit breaker (RCCD) as necessary	300 mA as per DIN VDE 0100-530 (sensitive to universal current)
Standard installation position	On the side of the frame side, at a max. distance of 3 m from the door

Fig. 20: Control unit

4 Door safety

The main closing edge is secured by a combination of a safety strip and a light barrier (C device plus D device). This achieves the minimum protection level as per EN 12453.

In addition the owner and the manufacturer have to consult with each other in order to provide a safeguard for the approach area. This will be based on the owner's risk assessment.

Safety strip and light barrier

1	Closing edge safeguard	Safety strip
2	Light barrier (optional)	Unidirectional light barriers (IP 67) max. 2 x

If the safety strip comes into contact with an obstruction during the closing procedure, the system stops, opens completely and closes automatically again once the "keep-open" time has elapsed.

The light barriers which are installed in the frame sides at the sides are positioned directly at the door closing level. The height of the light barriers is variable.

Fig. 21: Safety strip and light barrier

Door light grid (optional)

Closing edge safeguard	Door light grid
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The door light grid which is installed in the side of the frame monitors the closing level exactly, up to a height of 2.5 metres. The door light grid prevents the door from closing when an obstruction is detected.

Fig. 22: Door light grid

5 Equipment

Standard equipment

- Basic door construction, galvanised (275 g/m²)
- Low-lintel door leaf guide
- Aluminium slat, 105 mm x 20 mm
- EFA-CON® control unit
- Safety switch strip

Optional equipment (special equipment subject to surcharge)

- Basic door construction, galvanised (275 g/m²), with powder-coated finish as per RAL
- Basic stainless steel (V2A 1.4301) door construction, corrosion resistant, ground (grain 220)
- Viewing slat with SAN glass, 105 mm x 20 mm
- Viewing slat with polycarbonate glass (scratch resistant surface), 105 mm x 20 mm
- Ventilation slat, 105 mm x 20 mm
- Door leaf slats with powder coated finish with RAL colour
- mcp2 control unit in steel control cabinet
- mcp2 control unit in V2A control cabinet
- Door light grid
- Up to 2 safety light barriers
- Command devices: Push-buttons, pull switches, key switches etc.
- Command devices/safety: Radar detector, EFA-SCAN®, IR (infrared presence sensor)
- Lower panelling between consoles
- Locking mechanism
- Locking mechanism which can be shut off
- Hinged frame side cover
- Frame extension on both sides
- "Door open" limit switch, type Pepperl and Fuchs NJ 15
- "Intermediate stop" limit switch, type Pepperl and Fuchs NJ 15
- "Door closed" limit switch, Schmersal roller lever switch type, Euchner CES safety limit switch, Pepperl and Fuchs NJ 15

Special constructions

Special constructions/special orders are design types which are not covered, either mechanically or electrically, by standard versions in the sales price lists or by a design from the technology variants table. They have to be requested specifically. Surcharges and extended delivery times are calculated for special designs in accordance with the actual expenditure.



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