Certificate

on an EC Type Examination

Registration No. **01/208/5A/15/7011**

The TÜV Rheinland Certification Body for Lifts and their Safety Components at TÜV Rheinland Industrie Service GmbH hereby certifies to

Company **Kendrion (Villingen) GmbH**
Industrial Drive Systems
Wilhelm-Binder-Straße 4-6
78048 Villingen-Schwenningen

that the product

Product **spring-operated dual circuit brake**

Type **78 11029B00 / 78 11033B00 / 7811040B00**

fulfils the requirements of the European Parliament and Council Directive 95/16/EC of 29 June 1995 on the approximation of the laws of the Member States relating to lifts.

Evidence was obtained on 2015-09-24 in a verification for conformity.

Examination report No. 01/208/5A/15/7011 dated 2015-09-24

Document(s) forming the basis for the examination

Directive relating to lifts 95/16/EC
DIN EN 81-1:2010-06 / EN 81-1:1998+A3:2009
DIN EN 81-20:2014-11 / EN 81-20:2014
DIN EN 81-50:2015-02 / EN 81-50:2014

Use

Ascending car overspeed protection means

Subcomponent of the protection means against unintended car movement (UCM)

(For technical details see Annex)

This Certificate covering the placing of the product on the market will be valid until 2020-10-18 provided the as-built condition of the product is in conformity with the technical dossier examined.

Cologne, 2015-10-19

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TÜV Rheinland Certification Body
for Lifts and their Safety Components at TÜV Rheinland Industrie Service GmbH

Notified under No. 0035

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Special conditions applying to the use of the braking system as an "ascending car overspeed protection means"

Design/functioning of the protection means

The spring-operated dual-circuit brake is an electromagnetic component consisting of two spring-operated brake circuits which work independently of one another. The brake circuits arranged in a mirror-inverted way are controlled by a centralised magnetic system. The magnet case houses several guided compression springs which develop the axial spring reaction force needed to generate the braking moment.
Microswitches working independently of one another have been integrated in the brake circuits with a view to monitoring the braking system's operating status or switch position respectively.
By derogation from DIN EN 81-1:2010-06 / EN 81-1:1998+A3:2009, Paragraph 12.4.2.1 or DIN EN 81-20:2014-11 / EN 81-20:2014, Paragraph 5.9.2.2.2, the braking force shall be generated not only by components installed in two sets, but also by a system made up of pressure-actuated braking springs and special types of sleeves.
The protection means acts directly on the traction sheave via the shaft of the lift.
The braking system serves as a protection means. To prevent uncontrolled upward movement of the car at overspeed, the system is used in combination with an overspeed governor in conformity with DIN EN 81-1:2010-06 / EN 81-1:1998+A3/2009, Paragraph 9.9 or DIN EN 81-20:2014-11 / EN 81-20:2014, Paragraph 5.6.2.2.1. The electric safety device of the overspeed governor causes the activation (closure) of the braking system if a certain speed limit has been exceeded.

Scope

Braking torques

The requisite braking torque is the sum of the holding torque, retardation torque of the translational masses on braking action and the retardation torque of the rotating masses on braking action.
In this calculation, an average braking deceleration of about 1.0 m/s^2 (about 0.1 g) is to be taken into consideration.
The requisite braking torque will form the basis for selecting the transmittable torque corresponding to size 29, 33 or 40 (see Instruction Manual).

Maximum number of revolutions at which the speed governor is tripped

When the protection means responds (tripping of speed governor), the traction sheave must not exceed the maximum permitted number of revolutions at which the speed governor is tripped. For sizes 29, 33 and 40 this value has been set at 1250 min^{-1}. The maximum tripping speed shall be calculated as shown below on the basis of the above-mentioned maximum number of revolutions of the traction sheave and by giving due regard to the traction sheave diameter and the suspension of the car:

$$v_{Auslösegeschw.} = \frac{D_{Treibscheibe} \, x \, \pi \, x \, n}{60 \, x \, i}$$

where

$v_{Auslösegeschw.}$	Tripping speed [m/s]
$D_{Treibscheibe}$	Diameter of traction sheave [m]
π	3.14
n	Number of revolutions prompting tripping [1/min]
i	Suspension of the car

Functional conditions for the protection means

- The ascending car overspeed protection means constitutes a unit which is composed of the multi-redundant braking system acting on the traction sheave via the shaft, and the speed governor.
  By derogation from this, it is permitted to use any other means than the speed governor for monitoring speed and activating the braking system provided this means affords the same level of safety and has been subjected to the type examination beforehand.
- The protection means must act directly on the drive shaft of the traction sheave. If the braking system is to be mounted on the free side of the motor, the motor shaft must have been tested for fatigue strength beforehand.
- The brake's perfect operating status is monitored by means of two microswitches. Those wishing to use the system are required to have these switches integrated into the control circuit or fail-safe circuit of the lift. A faulty switch position of a microswitch must cause the stoppage of the lift immediately after completion of car movement. A movement commenced may be completed but then any further movement must be prevented. The malfunction must be identified as the cause of the inhibition of operation and be displayed accordingly.
- The maximum current carrying capacity of the contacts of the microswitches is 10 A with a rated voltage of 250 V (DC).
- The response of the braking system in accordance with its intended purpose must be detected (e.g. bistable safety contacts on the speed governor). Operation of the lift may be continued only after intervention by a competent person.
- The braking system may be used solely inside buildings.
- It is not intended for use in a damp and dust-laden environment and/or areas subject to explosion hazard.

Examinations, tests and maintenance

Further details about the examinations and tests to be carried out prior to the product's entry into service and about maintenance may be taken from the Instruction Manual.

Notes

- The design does not allow for a test to be carried out to determine the braking effect of the springs individually. The suitability has been verified in a hazard analysis and in continuous switch tests. The brake circuits may be tested individually.
- Provided the selection conditions specified in the Instruction Manual are complied with, deceleration of an empty ascending car (selection of mass ratios by the lift manufacturer) will not exceed 1 g when the car is braked.
- The intended use and operating conditions are described in the Instruction Manual and so are the requirements for installation and examinations and tests.

Special conditions applying to the use as a "subcomponent of a protection means against unintended car movement (UCM)"

Transmittable torque and response times related to a new brake element

Designation	Nominal braking torque (Nm)	Maximum number of revolutions prompting tripping (min^{-1})	Maximum response time (ms) t_0 (opening time)	t_A 50	t_A100
Size 29	2 x 125 2 x 155 2 x 195 2 x 250	1250	600 max.	240	620
Size 33	2 x 300 2 x 380 2 x 475	1250	600 max.	200	630
Size 40	2 x 475 2 x 560 2 x 700	1250	600 max.	200	710

t_A: Response time with 50% or 100% of the brake being closed.

Conditions

The brake may be used as an element of the protection means against uncontrolled car movement. In order to satisfy the requirements of DIN EN 81-1:2010-06 / EN 81-1:1998+A3:2009 or DIN EN 81-20:2014-11 / EN 81-20:2014, it must be combined with a component designed for detection and a component designed for tripping.

The installer involved is required to make a description and to draw up an Instruction Manual covering all aspects of UCM.

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As far as the braking torques are concerned, the masses of the lift shall be designed such that deceleration of the ascending/descending car will not exceed 1 g when the car is braked.

Documents to be supplied with the product

Instruction Manual BA 78 110..B00, edition of 2015-08-19

Cologne, 2015-10-19

Dipl.-Ing. Volker Sepanski

(The EC Type Examination Certificate may only be used in combination with the relevant Annex.)